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Courses of Study and Examinations

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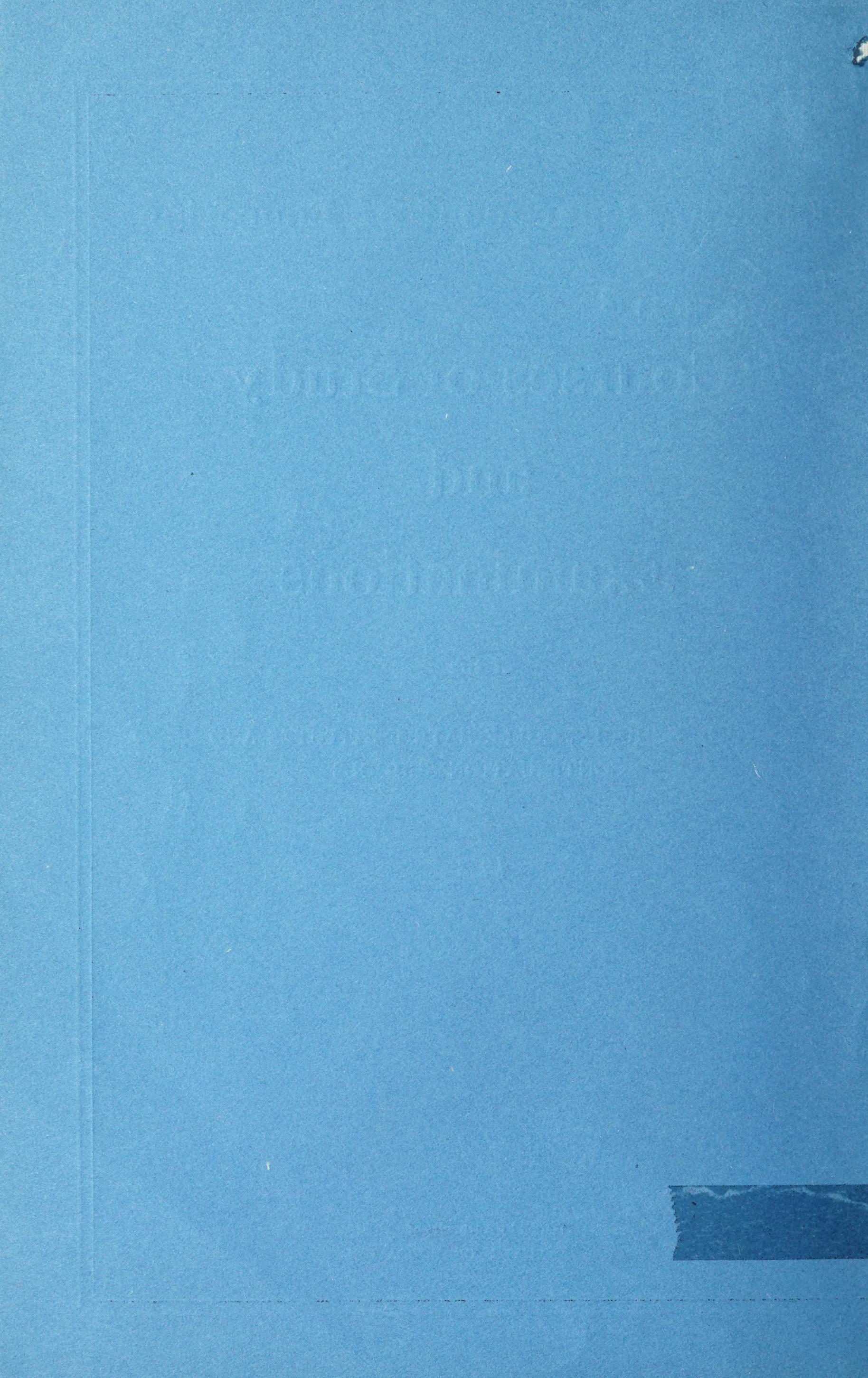
HIGH SCHOOLS, COLLEGIATE INSTITUTES AND
CONTINUATION SCHOOLS

1922

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Courses of Study

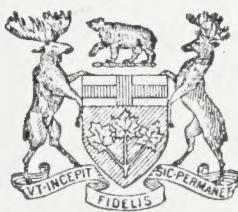
and

Examinations

of the

**HIGH SCHOOLS, COLLEGIATE INSTITUTES AND
CONTINUATION SCHOOLS**

1922



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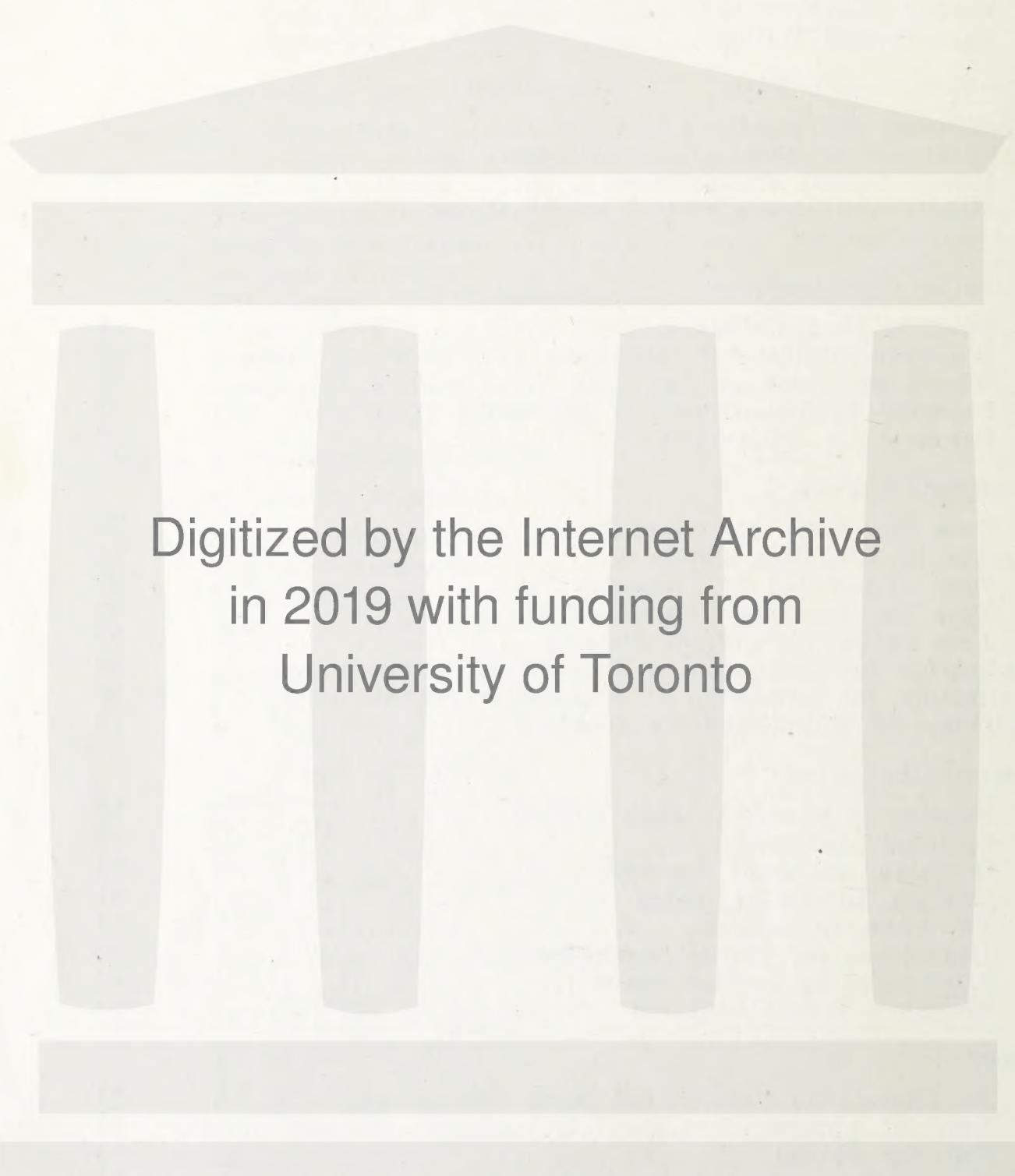
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HIGH SCHOOL COURSE OF STUDY.

Scope of the Course.

The High School course of study, detailed below, is designed to be a continuous and progressive course of five years. It comprehends a Lower School course of two years, followed by a Middle School course of two years, and an Upper School course of one year. From the Syllabus prescribed may be planned suitable courses for the needs of those pupils who desire to be admitted to the Normal Schools or to the Universities, or of those who wish to prepare for a business career, or of those who, not having such courses in view, desire merely to secure a general education.

SUBJECTS OF STUDY.

Lower School Subjects.

(A Two Years' Course).

1 (1) The following subjects are obligatory on each pupil in the Lower School:

English (Literature, Composition).
Canadian History and Civics, and Physiography (each for one year and not concurrently).
Algebra and Geometry (each for one year and not concurrently).

(2) The following subjects are optional:

Arithmetic,
Grammar,
Art,
Geography,
Botany and Zoology, (or Agriculture and Horticulture),
Latin,
French,
Greek,
German,
Spanish or Italian,
Manual Training,
Household Science,
Music,
Business Practice,
Stenography and Typewriting.
Additional subjects recommended by the local authorities and approved by the Minister.

Note:—Each of the following subjects in the above is a one year course, viz., Canadian History and Civics, Physiography, Algebra, Geometry, Arithmetic, Grammar, Art, Geography, Botany, Zoology.

Middle School Subjects.

(A Two Years' Course).

2. (1) The following subject is obligatory on each pupil in the Middle School:
English (Literature, Composition).
- (2) The following subjects are optional:
 - (a) Algebra,
Geometry,
Physics and Chemistry, or Agriculture and Horticulture,
British History,
Ancient History.
 - (b) Latin,
Greek,
French,
German,
Spanish or Italian.
 - (c) Manual Training,
Household Science,
Art,
Music,
Bookkeeping and Penmanship,
Stenography and Typewriting.
Additional subjects recommended by the local authorities and approved by the Minister.

Upper School Subjects.

(A One Year's Course)

3. The following are the subjects of the Upper School:
English (Literature, Composition),
Algebra,
Geometry,
Trigonometry,
Modern World History,
Physics,
Chemistry,
Biology (Botany and Zoology),
Latin,
Greek,
French,
German,
Spanish or Italian.
Additional subjects recommended by the local authorities and approved by the Minister.

LIMITATIONS.

4. (1) None of the Upper School courses may be taken up in a High School with a staff of only two regular teachers.

(2) Except on the report of the High School Inspector and with the approval of the Minister obtained beforehand, none of the Upper School courses may be taken up in High Schools with a staff of only three teachers.

(3) (a) The courses in Manual Training, Household Science, and Agriculture and Horticulture may be taken up in any school when provision therefor has been made satisfactory to the Minister on the joint report of the High School Inspector and the special Inspector or Director concerned.

(b) Due notice of the proposed establishment of any of the courses mentioned in (3) (a) above shall be sent to the Minister. Unless such notice is sent and the courses are approved by the Minister, their establishment will not be authorized.

Instruction to Be Provided.

5. (1) It shall be the duty of the Board of every High School or Collegiate Institute to provide instruction in the obligatory subjects of study, and in such of the optional subjects as they may select on the recommendation of the Principal.

(2) It shall be lawful for School Boards to establish and maintain part time High School courses of instruction for the education of adolescents who are required to take such courses by the provisions of the Adolescent School Attendance Act.

(3) On receiving the approval of the Minister Boards may add to the list of optional subjects of study such other subjects as may in their opinion be suitable for the needs of the locality.

(4) On the recommendation of the Principal Boards may direct that one or more subjects of the Upper School course be taken up in the second year of the Middle School course.

Selection of Subjects.

6. (1) In each of the two years of the Lower School course, every pupil shall take, in addition to the obligatory subjects, not fewer than two of the optional subjects and not more than eight subjects altogether.

(2) In each of the two years of the Middle School course, every pupil shall take the obligatory subject and not fewer than four or more than seven of the optional subjects.

(3) A pupil who passes the examination in English in the first year of the Middle School shall in the second year take the English either of the Middle School course or of the Upper School course, as the Principal may direct.

(4) A pupil in the Upper School may take such subjects of the Upper School course as may be approved by the Principal.

(5) No pupil shall be exempted from the course in Physical Culture except upon a medical certificate, or on account of evident physical disability, or for other reason satisfactory to the Principal.

7. In determining the maximum number of subjects to be taken by any pupil,

(1) Physical Culture, Manual Training, Household Science, and Music shall not be counted.

(2) Each of the foreign languages in Group (b) of the Middle School course shall count as two where the two-year course is being covered in one year.

(3) Where Middle School pupils in the second year of the Middle School course take one or more Upper School subjects, each subject so taken shall count as a Middle School subject.

RELIGIOUS EXERCISES AND INSTRUCTION.

8. (1) (a) Every High School shall be opened with the reading of the Scriptures and the repeating of the Lord's Prayer and shall be closed with the Lord's Prayer or the prayers authorized by the Department of Education; but no pupil shall be required to take part in any religious exercises objected to by his parent or guardian.

(b) (i) In schools without suitable waiting-rooms, or other similar accommodation, if the parent or guardian demands the withdrawal of a pupil while the religious exercises are being held, such demand shall be complied with and the reading of the Scriptures shall be deferred in inclement weather until the closing.

(ii) To secure the observance of this Regulation, the teacher, before commencing a religious exercise, shall allow the necessary interval to elapse, during which the children or wards of those, if any, who have signified their objection may retire.

(c) If the parent or guardian objects to his child or ward taking part in the religious exercises, but directs that he shall remain in the school room during such exercises, the teacher shall permit him to do so, provided that he maintains decorous behaviour during the exercises.

(d) If, in virtue of his right to be absent from the religious exercises, any pupil does not enter the school room till the close of the time allowed for religious exercises, such absence shall not be treated as an offence against the rules of the school.

- (e) When a teacher claims to have conscientious scruples in regard to opening or closing school as herein prescribed, he shall notify the Board to that effect in writing; and it shall then be the duty of the Board to make such provision as it may deem expedient for the carrying out of the requirements of (1) (a) above.
 - (2) (a) The Scriptures shall be read daily and systematically; the parts to be read may be taken from the book of selections adopted by the Department for that purpose, or from the Bible, or from the list of the Selected Scripture Readings of the International Bible Reading Association, as the Board by resolution may direct.
 - (b) A Board may also order the reading of such parts by both pupils and teachers at the closing of the school, the repeating of the Ten Commandments at least once a week, and the memorization of passages selected by the Principal from the Bible.
 - (c) If the Board does not pass the resolution provided for in (a) above, the Principal shall make the selection himself, and shall promptly notify the Board of his action. Such action may be revised by the Board at any time thereafter.
- (3) (a) A clergyman of any denomination shall have the right, and it shall be lawful for the Board to allow him, to give religious instruction to the pupils of his own church, in each school house, at least once a week, after the hour of closing the school in the afternoon.
 - (b) Under the same conditions, a clergyman, selected by the clergymen of any number of denominations, shall also have the right to give religious instruction to the pupils belonging to such denominations.
 - (c) If the clergymen of more than one denomination apply to give religious instruction in the same school house, where the number of class-rooms is insufficient for all at the same time, the Board shall decide on what day of the week a room shall be at the disposal of the clergyman of each denomination, at the time above stated.
- (4) Emblems of a denominational character shall not be exhibited in a High School during regular school hours.

SUBJECTS COMMON TO ALL THE FORMS.

Manners and Morals.

- 9. (1) Throughout the courses the teacher shall incidentally, from current events, from the lessons in literature, history, etc., by his selection of the supplementary reading, and by his own example as well as by precept, give instruction in moral principles and practices and in good manners.

Oral Reading.

(2) While Oral Reading is not prescribed as a separate subject of study, it is intended that it should be taken up systematically in connection with the study of English Literature. To as great an extent as possible, the teacher of Literature should put on the pupil the responsibility for the oral interpretation of the passages studied in the class. The teacher should, when he finds it necessary, read portions of the lesson for the sake of example, but he should always remember that the pupil can never acquire the power to communicate to others the meaning of the printed page unless he has been trained to do so by much practice in class.

Because of the suitability of its selections, both prose and poetry, for oral reading as well as for their value as literature, the Ontario High School Reader should be selected as one of the Literature texts for the First year classes.

Writing and Spelling

(3) By the time he enters the High School, the pupil should be able to write legibly and neatly, and to spell correctly the words in common use. But it should be the duty of the teachers to see that he does not lose this power, as he will inevitably do if not subject to constant oversight; and that he masters the spelling of the new words that he meets in his High School course. It is not expected that special lessons will be needed in Spelling and Writing; but it is believed that satisfactory results will be secured if every teacher on the staff insists that every exercise handed in by the pupil for examination and correction is correctly spelled and neatly written.

At all the Lower, Middle and Upper School examinations marks to the maximum of ten will be deducted for errors in spelling in each of the answer papers.

Supplementary Literature.

(4) In all the Forms and in every year of the course, supplementary Reading shall be taken in connection with the English Literature. At the beginning of each school year a short list should be made out for each Form, under at least four heads, of such suitable works as may be obtained in the school, public, or other library, and each pupil should be required to read during the year at least one under each head in addition to those taken up in class.

Physical Culture.

(5) (a) The main object of the course is the symmetrical development of the body, securing at the same time strength and grace, with correct and prompt obedience to the will.

(b) A systematic and well-developed course of exercises in Drill and Calisthenics, both free and with apparatus, and in Gymnastics, when practicable, should be taken up in each of the sub-divisions. While dependent to some extent upon the accommodations and equipment, the exercises should al-

ways be suitable in character and frequency to the age and physical condition of individual pupils. Prevailing defects should be studied and exercises and directions given to correct them.

(c) The course in Drill, Calisthenics, and Gymnastics is obligatory in Collegiate Institutes and in High Schools which have a gymnasium, and shall be taken up an hour and a half every week in each Form of the Lower School, and an hour every week in each of the Middle and Upper Schools.

(d) In High Schools having no gymnasium, Gymnastics may be omitted, and Drill and Calisthenics shall be taken up systematically throughout the year.

(e) In all Forms the sexes shall be separately trained in Physical Culture by male and female teachers respectively in the Collegiate Institutes and the High Schools.

(f) In High Schools with two teachers the organization of the classes in Physical Culture shall be subject to the report of the Inspector.

(g) When the weather permits, the Principal may substitute each week for not more than half the time prescribed above for Physical Culture, suitable sports and games, in which all the members of a class shall take part, and which shall be under the supervision of one or more of the members of the staff.

(h) Where a Cadet Corps is maintained the courses therefor shall be given in accordance with the Regulations of the Department of Militia and Defence, Ottawa. See Departmental Circular: Instructions No. 10.

(i) The following are the topics and sub-topics of a recommended course in Calisthenics, Athletics, and Gymnastics:

I. LOWER SCHOOL.

Boys.

Calisthenics: Dumb-bells; Wands; Land Drill; Swimming.

Apparatus: Horse—Vaults; Mats—Jump, Hops, etc., Front and Back Rolls; Vaulting Bar—Vaults, same as Horse; Buck—Vaults, same as on Horse and Vaulting Bar; Hanging Exercises on Suspended Ladders or Suspended Parallel Bars.

Indoor Games: Basket Ball; Indoor Baseball; Volley Ball; Athletic Dances and Drills.

Outdoor Athletics: Running, Jumping, etc.

Girls.

Calisthenics: Dumb-bells; Wands; Clubs; Land Drill; Swimming.

Apparatus: Mat Exercises, Hanging Exercises on Ladder or Suspended Parallel Bars.

Steps: Basic Fancy Steps; Rhythrical Balance Exercises.

Gymnasium Games: Basket Ball; Volley Ball; Varied Games, as Follow the Leader, Hang Tag, etc.

II. MIDDLE AND UPPER SCHOOL.

Boys.

Calisthenics: Dumb-bells; Wands; Land Drill; Swimming; Life-saving methods.

Apparatus: Horse—Vaults; Feints; Circles—Combinations; Mats—Rolls, Dives, Handstands, etc.; Parallel Bars—Rests, Sets, Walks, Vaults, Spreads; Horizontal Bar—Grasps, Rests, Circles, Underswings; Rings—Hangs, etc.

Indoor Games: Basket Ball; Indoor Baseball; Volley Ball; Athletic Dances and Drills.

Outdoor Athletic Games: Lacrosse; Soccer; Rugby; Hockey; Basket Ball; Single Stick Exercises.

Girls.

Calisthenics: Dumb Bells; Wands; Land Drill; Swimming; Life-saving methods.

Apparatus: Horse—Vaults and Seats; Mats—Hops, jumps, etc.; Vaulting Bar—Runs under, underswings; Buck—Vaults, Rests, Seats; Rings—Hangs.

Folk Dances and Figure Marching.

Indoor Games: Basket Ball; Indoor Baseball; Volley Ball.

Note.—The courses for teachers' certificates in Physical Culture now include swimming, and where local facilities are available provision should be made for instruction in the subject.

Apparatus

The following apparatus should be provided in all gymnasiums:—

For Boys

OBLIGATORY.—Two Horizontal Bars—one at least to be adjustable to different heights. Pair of Adjustable Parallel Bars. Travelling Rings—at least six. Horizontal Ladder. Flying Rings—one pair. Incline Board. Jump Board. Balance Beam. Gymnasium Scale. Wooden Dumb Bells. Indian Clubs. Wands. Rifles or Wooden Rifles. Medicine Ball—6 or 8 lbs. Mattresses—thickness, 2 inches—two, four feet by ten feet;

two, four feet by four feet. Horse. Climbing Rope. Basket Ball, Indoor Base Ball, Volley Ball.

OPTIONAL.—Chest-weight Machines. Suspended Parallel Bars. Wall Machine. Quarter Circle. Vaulting Buck. Wall Horizontal Bar. Striking Bag. Vaulting Standard. Folding Hurdle. Vaulting Poles.

For Girls

OBLIGATORY.—Wands. Indian Clubs. Wooden Dumb Bells. Chest Weight Machines. Basket Ball. Volley Ball. Indoor Base Ball. Horizontal Ladder.

OPTIONAL.—Parallel Bars. Travelling Rings. Flying Rings. Quarter Circle.

The following books of reference will be found useful in Physical Culture and should be placed in all High School libraries:

Books of Reference

Syllabus of Physical Exercises for Public Schools. Copp, Clark Co.

Physical Training, including First Aid. Jas. W. Barton, M. D., Physical Director, University of Toronto. Musson Book Co., Toronto.

Games for Playgrounds, Class-Room, Home and Gymnasium. James H. Bancroft. Macmillan Co., Toronto.

At Home in the Water. Geo. H. Corsan. Association Men Press, New York.

Handbook of Rhythrical Balance Exercises. Grannis Press, New York.

DETAILS OF THE SUBJECTS OF STUDY.

Lower School Subjects

ENGLISH GRAMMAR.

A formal course for one year, covering the general principles of syntax and etymology, together with a simple account of the development of the language. Aside from this formal course, Grammar should be taken as a part of Composition.

ENGLISH COMPOSITION.

Oral and written composition; elements of Narration, Description, Exposition, and Argumentation.

Letter writing.

Oral and written reproductions or abstracts.

Class debates.

Systematic and careful application of the principles of

good English to the correction of mistakes made by the pupils in speaking and writing.

Good composition in all written work should be demanded by every teacher.

Notes: 1. Actual practice in oral and written compositions should largely predominate. The main principles of composition (rhetoric) should be learned from the criticism of the compositions, and systematized as the work proceeds.

2. For some weeks at a time the minute study of the English Literature texts may be intermittent and some of the time thus set free devoted to English Composition, in the teaching of which the Supplementary Reading might be utilized, and compositions might be written in the class under the supervision of the teacher.

3. The spelling and the writing of the compositions and other written exercises should be constantly supervised. If the pupils have been properly prepared in the Public and Separate Schools, special provision for these subjects should be unnecessary.

ENGLISH LITERATURE.

Intelligent comprehension and oral reading by the pupils of suitable authors, both prose and poetry.

Systematic reading by pupils of the texts studied in class.

Supplementary Reading provided by the pupils themselves or supplied from the school, public, or other library.

Memorization and recitation of choice selections in prose and poetry prescribed by the Department and of others made by the teacher.

Note.—The object of the course in the Lower School is the cultivation of a taste for good literature, not by minute critical study, but by reading at home and in school aloud and silently, with due attention to the meaning, standard authors whose works will quicken the imagination and present a strong element of interest. Such authors should be chiefly narrative, descriptive, and dramatic. The selection of the works to be read in the classes of the Lower School rests with the Principal, who should be guided in his selection by the advice of the teacher of English.

CANADIAN HISTORY AND CIVICS.

Notes.—1. For the Lower School examination sections III. and VI. of this course are compulsory. In addition, candidates must take either sections I. and II., or sections IV. and V.

2. The course in Canadian History includes the geography of the history prescribed.

I. DISCOVERY AND EXPLORATION.

- (1) The marine discoverers: The Norsemen, Cabot, Cartier, etc.
- (2) The opening up of the St. Lawrence valley, the great lakes and the prairies by the French: Champlain, Radisson, Marquette, Joliet, La Salle, La Verendrye.
- (3) The search for the Northwest Passage: Frobisher, Hudson, Hudson Bay Company, Hearne, Franklin, Amundsen.
- (4) Fight for the fur: The Northwest Company, MacKenzie, Fraser and Thompson, early exploration of the Pacific coast.

II. SETTLEMENT AND COLONIZATION.

- (1) The story of French settlements in Acadia and Canada: Where the settlers came from, where they settled, what their difficulties were, why the colony did not grow faster.
- (2) Character of British immigration after the Conquest of 1760.
- (3) The Loyalist immigration into the Maritime Provinces and Upper Canada; its significance.
- (4) Immigration into Ontario, 1791-1850: Various elements and where they settled.
- (5) The first settlements in the west: Red River, and later, Vancouver Island, B.C. Why settlement did not spread there sooner.
- (6) The opening up of the Great West: C.P.R., Immigration policy of the Laurier Government, etc.

III. DEVELOPMENT IN THE GOVERNMENT OF CANADA.

- (1) Under the French:
 - (a) Company Government.
 - (b) Royal Government.
- (2) Under Britain:
 - (a) 1763-1791, a very brief treatment without details of the Quebec Act.
 - (b) Representative government 1792-1837:
 - (i) Division of Canada.
 - (ii) General character of government without details of the Constitutional Act.
 - (iii) Grievances of the people.
 - (c) Period of Change:
 - (i) Rebellion of 1837.
 - (ii) Work of Lord Durham.
 - (iii) Union of provinces (without details of Union Act.)
 - (iv) Gradual winning of responsible government 1841-1850.

- (v) Settlement of questions of Clergy Reserves and Seignorial Tenure.
- (vi) Discontent with Union.
- (d) Confederation:
 - (i) Events and conditions leading to Confederation.
 - (ii) B.N.A. Act very simply explained.
 - (iii) Addition of other provinces and territories.

IV. EXTERNAL RELATIONS OF CANADA.

- (1) The wars between France and England in America; a brief sketch only.
- (2) Canada and the American Revolution.
- (3) The War of 1812-14.
- (4) The hundred years of peace:
 - (a) Rush-Bagot Agreement.
 - (b) Boundary disputes.
 - (c) Occasional strained relations: Trent affair, Fenian Raids, etc.
 - (d) Trade negotiations; tariffs, reciprocity.
- (5) Our Relations to Great Britain:
 - (a) Our growing autonomy.
 - (b) Our part in the Boer War.
 - (c) Our part in the Great War.
 - (d) The Colonial and Imperial Conferences.
- (6) Our relations to the world:
 - (a) Our membership in the League of Nations.
 - (b) Our participation in international conferences.

V. CANADA SINCE CONFEDERATION.

- (1) The days of Sir John A. Macdonald.
- (2) The days of Sir Wilfrid Laurier.
- (3) Canada during the Great War.

VI. THE FOLLOWING ELEMENTS OF CANADIAN WELFARE:

- (1) Health:—A study of the following agencies that promote good health:
 - (a) Those that secure for us pure food, exercise, and cleanliness.
 - (b) Those that prevent contagion.
 - (c) Those that restrict the use of drugs.
 - (d) Those that regulate working hours and conditions.
- (2) Education:—A study of the opportunities for education, and of the institutions or agencies concerned in providing or fostering education.
- (3) Civic Beauty:—A study of civic beauty in the home,

the school, the street, in water-fronts, in parks, in architecture, and in town planning.

- (4) Transportation:—A study of the following features of transportation: roads, streets, bridges, waterways, railroads, electric railways.
- (5) Government, with special emphasis on municipal government.

Note:—The aim in teaching these topics in Civics shall be threefold: (1) to interest the pupils in problems of civic welfare, (2) to lead them to gather, with the help of the teacher, a moderate amount of information concerning conditions and agencies, especially in their own neighborhoods, (3) to give them clear ideas concerning government, liberty, rights and law, and to create in them a sense of personal responsibility for the welfare of the community and the country.

BOOKS OF REFERENCE.

The following books will be found useful for supplementary reading on the topics of the course, and should be placed in every High School library:—

Chronicles of Canada, 32 Volumes, Glasgow, Brook & Co.
Makers of Canada, 12 volumes, Glasgow, Brook & Co.

(These two series deal with almost every phase of Canadian history. The first series is more suitable for younger pupils).

The Works of Francis Parkman, 12 volumes, Little, Brown & Co. (The French period).

Edgar, The Romance of Canadian History, Macmillan. (Excerpts from Parkman).

Roberts, History of Canada, Macmillan.

Laut, Pathfinders of the West, Macmillan.

Locke, When Canada was New France, Dent.

Wallace, By Star and Compass, Oxford Press.

Everyman's Literary and Historical Atlas of America, Dent.

Barnard, The Teaching of Community Civics, Bulletin No. 23, 1915, of U.S. Bureau of Education.

ARITHMETIC

Review of principles; measures and multiples; fractions, (vulgar and decimal); compound quantities, including the metric system; problems on ratio, time, motion, work, etc.; square root; applications of percentage; commission, insurance, duties, taxes, interest, discount, stocks and exchange; the uses of common business forms.

Oral Arithmetic.

Mensuration: The rectangle, triangle, circle, parallelopiped, prism, cylinder, pyramid, cone and sphere.

Notes:—(1) It is suggested that this course should be taken in the second year of the High School course, rather than in the first.

- (2) The processes and problems in the commercial work should be such as find direct application in ordinary life. Accuracy, rapidity, and neatness of work should be kept in view.
- (3) The common business forms to be taken up are as follows: receipts, promissory notes, drafts, orders, deposit slips, cheques, bills of goods, invoices, accounts; endorsement and consequent liability.

ALGEBRA.

Elementary work; factoring; H.C.F. and L.C.M.; fractions, simple equations of one, two and three unknowns.

GEOMETRY.

Definitions; fundamental geometric conceptions and principles; use of simple instruments, compasses, protractor, graded rule, set square; measurement of lines and angles, and construction of lines and angles of given numerical magnitude; accurate construction of figures.

Some leading propositions in plane geometry, reached by induction as a result of accurate construction of figures; deduction also employed as principles are reached and assured.

A course embracing a selection of the leading propositions in Elementary Synthetic Geometry, with simple exercises and deductions thereon.

The following are the topics of this course:

Constructions.

- To construct a triangle with sides of given length.
- To construct an angle equal to a given rectilineal angle.
- To bisect a given angle.
- To bisect a given straight line.
- To draw a straight line perpendicular to a given straight line from a given point not in the line.
- To find the locus of a point equidistant from two given straight lines.
- To find the locus of a point equidistant from two given points.

To draw a straight line parallel to another, through a given point.

To divide a given straight line into any number of equal parts.

Theorems.

The sum of the angles of any triangle is equal to two right angles.

The angles at the base of an isosceles triangle are equal, with converse.

If the three sides of one triangle be equal, respectively, to the three sides of another, the triangles are equal in all respects.

If two sides and the included angle of one triangle be equal to two sides and the included angle of another triangle, the triangles are equal in all respects.

If two angles and one side of a triangle be equal to two angles and the corresponding side of another, the triangles are equal in all respects.

If two sides and an angle opposite one of these sides be equal, respectively, in two triangles, the angles opposite the other pair of equal sides are either equal or supplemental.

The sum of the exterior angles of a polygon is four right angles.

The greater side of any triangle has the greater angle opposite it.

The greater angle of any triangle has the greater side opposite it.

If two sides of one triangle be equal respectively to two sides of another, that with the greater contained angle has the greater base, with converse.

If a transversal fall on two parallel straight lines, prove the relations between the angles formed, with converse.

Lines which join equal and parallel straight lines towards the same parts are themselves equal and parallel.

The opposite sides and angles of a parallelogram are equal and each diagonal bisects it.

ART.

Aim of the Course.

The teacher of Art should realize fully the aim of the Course in Art, which can be expressed briefly as follows:

- (a) To equip the students with the ability to draw freely and expressively as an aid in the development of the faculties of observation and inventiveness.
- (b) To give the students practice in the use of various mediums of expression; to enable them to observe

their limitations and powers of expressiveness.

- (c) To develop the art of design in relation to nature and life. To cultivate a keen perception of beauty and orderly composition in natural forms and ability to apply such knowledge to beautifying common things of daily use.
- (d) To teach the meaning of colour as a stimulus to the aesthetic sense and its wise and significant use.
- (e) The Art teacher must endeavour to gain the co-operation of every activity of school life and to correlate the course with other departments, to observe and respond to the particular needs of schools in communities where special industrial art trades are established; to aid in the formation of loan exhibitions, of prints, drawings, paintings, craft work; to use the Art Galleries, Museums, Craft Shops of the cities and towns and to add to the experience and appreciative powers of the student.
- (f) Finally, to send the students out of the schools aesthetically alive to their surroundings; to aid those with special talent to specialize in the direction of their talent; and thus aid in the development of an Art loving public.

The Aim of the Course in Art can be expressed from the writings of John Ruskin, and may be adopted as a general aim and ideal for the course in Drawing:

“Learn Drawing—that you may set down clearly, and usefully, records of such things as cannot be described in words, either to assist your memory of them, or to convey distinct ideas of them to other people; to obtain quicker perceptions of the beauty of the natural world and to preserve something like a true image of beautiful things that pass away to understand the minds of great painters and to appreciate their work sincerely.”

COURSE OF STUDY.

Note:—An examination on the following course will be required of all candidates for the Lower School examination for admission to the Normal Schools. The course is planned for five 40 minute periods, or their equivalent, per week for one year.

I. FREEHAND DRAWING.

- (1) In outline. (2) In tones expressive of light and shade, and of colour values. (3) In colour.

Studies shall be selected from each of the following groups:

- (a) Plant forms, such as grasses, fruits, vegetables, flowers, seed-pods.
- (b) Animal forms, such as butterflies, shells, the best known Canadian birds.
- (c) Curvilinear and rectilinear objects of simple form,

such as pails, pottery, boxes, books, singly, and in small groups.

Careful attention shall be given

- (a) to the size and to the position of the drawing on the sheet.
- (b) to the expression of lines of growth in natural forms.
- (c) to proportion.
- (d) to the principles of foreshortening and convergence.
- (e) to pencil and brush technique.

Exercises in direct brushwork shall precede painting in colour.

Exercises shall be given in memory drawing of objects previously drawn, or observed.

II. DESIGN.

The basic principles of design shall be followed:

- (a) in the adaptation of previously drawn natural forms to the designing of decorative units, borders, and surface patterns; to the filling of spaces, such as the circle, lunette, rectangle, and triangle.
- (b) to the making, with and without mechanical aid, of Roman capitals and numerals, and to their arrangement in dates, titles and sentences; and to the designing of initial letters and monograms.

Small stencils and blocks may be cut and used for the transfer of simple units of design to objects of use and adornment.

Designs shall be worked out in black and white, in balanced neutral tones, and in colour schemes.

Colour including its properties and simpler harmonies shall be studied in connection with drawing, design, and composition.

III. APPRECIATION.

The composition and other artistic qualities of pictures shall be studied:

- (a) to develop in the student an appreciation of the best in art.
- (b) to improve the quality of his own work in drawing and in design.

It is recommended that the student be encouraged to collect and mount in a blank drawing book reproductions of good examples of paintings, of buildings, of sculpture, of decorative designs, of lettering, and of advertising drawings.

Equipment for Teaching Art

The following equipment should be provided in every High School for the teaching of Art:

Models

Adequate provision of type objects, models of common objects, ceramics, and pictures is indispensable.

The following lists are given for guidance:

1. Type objects made of wood and painted white.

One each of

Sphere, 12 inches diameter.

Cylinder, 8 x 12 inches.

Cone, 8 x 12 inches.

Six each of

Square Prism, 8 x 12 inches.

Square Pyramid, 8 x 12 inches.

Cube, 8 inches face.

Hexagonal Prism, 8 x 12 inches.

Circular Plinth, 8 x 2 inches.

Square Plinth, 8 x 2 inches.

2. One skeleton form of a cube 2 ft. and a square pyramid, 2 ft. base and 2 ft. high.

3. Ceramics: Pots, kettles, drinking-glasses, pitchers, cups, vases, candlesticks, jardinieres, etc.

Note.—The ceramics should be chosen, not only for their individual beauty, but for their form value in grouping and their colour value in a general scheme of colour harmony.

4. Unique objects, suitable for decorative purposes; Chinese lanterns and parasols, objects of Indian manufacture, etc.

5. Plaster casts: Plaques, busts, figures, groups of figures, and historic ornament. Casts are optional in the Lower School, but are desirable for both decorative and instructional purposes.

Notes: 1.—Carbon reproductions, etchings, and engravings of famous buildings, landscapes, and figures should also be provided, to exemplify the laws of composition and to give the pupils some knowledge of the work of the great artists. These should be provided primarily as school decorations; they are not to be classed as Art Models.

2.—For lists of suitable pictures, reproductions, and casts, see Educational Pamphlet, No. 5: List of Reproductions of Works of Art.

3.—In schools unable to purchase an adequate supply of the more expensive pictures, the cheap reproductions may be used to supplement. When, also, schools become acquainted with the masterpieces in this economical way, they will be better able to decide which of the more expensive reproductions to purchase.

4.—Under the tariff, maps, photographic reproductions, casts, etchings, and lithographic prints or charts are specified as free, when specially imported in good faith by order of any College, Academy, School or Seminary of learning in Canada, for use to demonstrate or to instruct students and not for sale.

Working Equipment

1. Teachers' Easel and Drawing Board.
2. Drawing Boards for Pupils (three-ply, 13 inches x 17 inches).
3. Stands for models.
4. A water bottle for each pupil (4 oz. wide-mouthed pomade bottle).

Reference Books

The following books will be found useful for Supplementary reading in Art and should be placed in every High School library:

A Guide to Pictures, by Charles H. Caffin. Doubleday, Page & Co., New York

How to Enjoy Pictures, by M. S. Emery. The Prang Educational Co., New York.

Illustrated Exercises in Design, by E. G. Branch. The Prang Educational Co., New York.

Freehand Perspective and Sketching, by D. M. Norton. D. M. Norton, Pratt Institute, New York.

Pencil Sketching, by G. W. Koch. The Prang Educational Co., New York.

Art Education for High Schools. The Prang Educational Co., New York.

Apollo, The History of Art throughout the Ages, by S. Reinach. Charles Scribner's Sons, New York.

The School Arts Magazine, edited by H. T. Bailey. The Schools Arts Publishing Co., Boston.

GEOGRAPHY.

Commercial and Map. The study of the following, with regard to their physical features; the influence of their geographical conditions on their political, industrial, and commercial development; their principal resources, industries, and productions; their chief centres of population; the condition of the people and their forms of government:

- (1) The countries of Central America, South America, Europe and Africa.
- (2) The United States, Mexico, China, and Japan.
- (3) The United Kingdom; the Dominions of Canada and Australia, the Union of South Africa, India, and other important component parts of the British Empire.

Map study in connection with the above countries.

The countries in (1) and (2) to be studied in outline; those in (3) in greater detail.

Notes.—(1) The course in Commercial and Map Geography, even when studied in detail, should not deal with minute particulars; nor should the pupil be required to memorize the exact statistics, even in the case of the most important; as statistics change from time to time, round numbers will be sufficient. With such general knowledge the pupil will have sufficient for the ordinary purposes of life. When he needs special particulars, he may readily find them in books of reference.

(2) Books of travel and other supplementary reading from the school or public library should be supplied; also, when practicable, exhibits of the products characteristic of the countries studied; and pictures and photographs of famous places.

PHYSIOGRAPHY.

The course in Physiography is intended to be, as far as possible, an experimental and practical one carried on in the science laboratory and in the field by teachers who are skilled in laboratory practice. The only text-books available at present are the Ontario High School Physical Geography and the Ontario High School Physics, but while most of the headings are taken from the titles of chapters or sections in these books (in which cases the contents of the chapters or sections may be regarded as the prescription of work) it is obvious that they will have to be supplemented by students' note-books containing records of experiments and observations, drawings of apparatus, etc.

Under no conditions should an attempt be made to subdivide the subject of Physiography into Physical Geography and Physics, taught by different members of the staff. To do so would be to defeat one of the main objects of the course.

DETAILS OF THE COURSE.

Physiography: Meaning of the term, how related to other subjects.

Measurements: Measurements in metrical units of length, area, volume and mass; comparison of metrical and British units; the balance; practice in weighing; the three states of matter; the thermometer; Fahrenheit and Centigrade scales.

The Earth's Surface:

Rocks: Examinations of hand specimens of granite, sandstone, limestone, shale, gneiss, conglomerate.

How rocks are formed.

Classification of rocks.

The effects of changes in temperature on rocks; experiments to show the expansion and contraction of liquids and solids by changes in temperature; the abnormal expansion of water on freezing.

Air: Experiments,—Constituents of air; combustion in air, and the resulting changes; rusting of a metal such as iron in the air and how it affects the air; detection of carbon dioxide and water vapour in air.

Water: The work of ground water and of running water.

Simple experiments to illustrate the removal of suspended matter by filtration; the solvent power of water; the removal of dissolved matter by distillation; the solvent power of water

containing carbon dioxide; the absorption of water by some kinds of rock.

Wind-work and weathering.

Other disintegrating agencies.

The work of plant and animal life in the formation of soil.

The work of waves and of ice masses.

A detailed study of the following:—rivers, valleys, lakes, glaciers, underground waters, caverns, springs, mineral veins.

To accompany this:—statement and experimental verification of Pascal's Law, some of its most important applications; pressure of liquids in its relation to direction, depth, density of liquid, area pressed, and the shape of containing vessel; Archimedes' Principle; flotation; determination of the specific gravity of a solid such as quartz or granite and of a solid such as wood or ice, and of the specific gravity of a liquid by the specific gravity bottle and by the hydrometer.

Plains, mountains and plateaus.

Volcanoes and earthquakes: Simple experiments to show that heat is produced by friction, by percussion, by compression, by combustion; simple experiments to illustrate the expansion of gases by changes in temperature; freezing and boiling points of water in relation to pressure.

Atmosphere: Experimental study of the properties of a gas exhibited in air as a type; proof that air has weight, occupies space, and exerts pressure; construction of the barometer; the relation between the volume and the pressure of a gas; practical application of air pressure; common pump, siphon.

Water vapour in the air; clouds and fog, dew and frost, precipitation, winds, storms, weather, climate; temperature of the atmosphere; maximum and minimum thermometers.

Experiments on the transmission of heat by conduction, convection and radiation.

Experiments on evaporation and boiling; the boiling and freezing points of water; relation of the boiling point of water to pressure; simple experiments to illustrate the heat of fusion of ice, and the heat of vaporization of water; simple experiments to show the high specific heat of water; experiment to show that the freezing point of salt water solutions is lower than the freezing point of pure water.

The Sky: Simple experiments on reflection, refraction and dispersion of light with special reference to atmospheric phenomena, e.g., color of the sky, halos, rainbows.

The Ocean: Sea-water, sea-floor, ocean basins, waves, currents, tides. Temperature of the ocean, changes in the shore line, deep sea sounding, islands and ocean life.

Simple experiments to illustrate centrifugal force; relation of centrifugal force to tidal movements.

The Earth's Magnetism: Simple experiments on magnets; simple experiments to illustrate magnetic attraction and repulsion and the phenomena of magnetic induction; neutralization of poles; magnetism induced by the earth; magnetic and geographical poles of the earth; the mariner's compass; declination and inclination.

The Solar System: Simple experiments to show that light travels in straight lines; shadows, umbra and penumbra.

Motions of the sun, moon, and earth; eclipses of the sun and moon; day and night; seasons; moon's phases; latitude; longitude; standard time, solar time, sidereal time.

Life on the Earth.

Geological History of Canada.

Laboratory Equipment

It is recommended that there should be provided for each group of two (or three) pupils a set of apparatus consisting of the following:

- 1 Metre Stick.
- 1 Dissected Litre Block.
- 1 Pinch-Cock.
- 1 Burette, Mohr's, 50 C. C. graduated in tenths.
- 1 Measuring Cylinder, 100 C. C. graduated.
- 3 Beakers, different sizes.
- 1 Physical Balance with set of Metric Weights.
- 1 Bunsen Burner or Spirit Lamp.
- 1 Spring Balance.
- 2 Thistle Tubes.
- 1 Bucket and Cylinder (Archimedes' Principle apparatus).
- 1 Overflow Can, capacity about 450 C. C.
- 1 Catch Bucket, capacity about 175 C. C.
- 1 Specific Gravity Bottle.
- 1 Hydrometer, Demonstration, of paraffined wood weighted at one end.
- 1 Hare's Balancing Column Apparatus.
- 1 Barometer Tube, heavy glass.
- 1 Filter Funnel.
- 1 Retort Stand, with two rings.
- 3 Florence Flasks with perforated rubber stoppers to fit.
- 1 Hydrometer Jar.
- 1 Chemical Thermometer, graduated in C. degrees from -10 degrees to 100 degrees.
- 1 Chemical Thermometer graduated in F. degrees from 10 degrees to 220 degrees.
- 1 Ball and Ring for demonstrating expansion of metals.
- 1 Conductometer, simple form consisting of rods of different metals radiating from a common metal centre.
- 1 Convection Apparatus for showing convection of currents in air.
- 1 Lift Pump, glass model.
- 1 Glass Siphon.

- 2 Plane Mirrors, 10 cm. x 10 cm.
- 1 Equilateral Prism.
- 1 Index of Refraction Plate.
- 1 Glass Tube about 2 cm. in diameter and 50 cm. long.
- 1 Glass Tube about 3 cm. in diameter and 50 cm. long.
- 2 Bar Magnets.
- 1 Horseshoe Magnet.
- 1 Compass.
- 1 Bar of Soft Iron, round, six inches long.
- 1 Dipping Needle.
- 1 Test Tube Rack.
- 1 Doz. Test Tubes, 4 inches x $\frac{1}{2}$ inch.
- 1 Doz. Test Tubes, 5 inches x $\frac{3}{4}$ inch.
- 1 Pound Glass Tubes, (soft) $\frac{1}{8}$ inch to $\frac{1}{4}$ inch.
- 2 Yards Rubber Tubing, $\frac{3}{16}$ inch inside measurement.
- 2 Files, one round, one triangular.
- 1 Package of Filter Paper, circles, 6 inches.
- 1 Square foot Sheet Rubber.
- Copper Gauze.

In addition to the apparatus specified above the Physiography Laboratory should contain the following pieces of apparatus for class demonstration:—

- 1 Set of Rocks and Minerals. A very suitable set can be obtained from the Geographical Survey, Ottawa, at a cost of \$6.00.
- 1 Air Pump. The Geryk type can be recommended.
- 1 Set of Metric Weights and Measures.
- 1 Water Motor.
- 1 Rotator or Whirling Table.
- 1 Centrifugal Force Apparatus.
- 1 Maximum and Minimum Thermometer.
- 1 Differential Thermometer.
- 1 "Pascal's Vases" Apparatus.
- 1 Mercury Barometer.
- 1 Aneroid Barometer.
- 1 Anemometer.
- 1 Hydraulic Press, glass model.
- 1 Optical Disc.
- 1 Mariner's Compass.
- 1 Maximum Density of Water Apparatus.
- 1 Davy's Safety Lamp.
- 1 Fire Syringe.

BOTANY.

The course in Botany as outlined below is based on the authorized text-book, Bailey's Beginners' Botany. This book is intended to be used not only as a textbook, but also as a book of reference, as it contains matter for general reading which is beyond the limits of the course.

The course in Botany is to be essentially practical and experimental, and it is expected that the pupils will continue to use note-books for drawings and for records of experiments and observations.

The teacher's immediate responsibility lies in the laboratory work, but this should be supplemented by out-door work which will of necessity vary with the locality. The teacher should encourage and direct the pupils, devoting a fair portion of the time of the class to discussions and reports on their independent work. Arrangements should be made for field excursions on suitable occasions.

The division of the course into three seasonal groups is intended merely as a suggestion to the teacher and not as a fixed arrangement.

Fall Term.

The Plant as a Whole: A study of common plants such as buttercup, phlox, petunia, mallow, mustard, sweet alyssum, bouncing bet. At least four should be studied in detail, taking up the structures of all the parts in succession; the study of additional plants to illustrate the various forms of roots, the structure, arrangement, margin and form of foliage leaves, the relation of leaves to sunlight and air, the varieties of stems as underground, erect, prostrate, climbing, twining, etc.; the common types of inflorescence.

Study of typical composites, e.g., dandelion, sunflower, chicory, etc. The identification, by the use of a botany key, of a few common plants.

Fruits: Meaning of the term; structure and classification of the fruits of such plants as bean, shepherd's purse, milk-weed, poppy, apple, sunflower, tomato, grape, plum, cucumber, corn and maple; adaptations for the dispersal of seeds and fruits.

Fungi: Recognition and mode of life of the following saprophytes: Mushroom, puff-ball, polypore; recognition, economic importance and control of the following parasitic fungi: grain-rust (*Puccinia graminis*), loose smut of oats (or corn smut), apple scab and black knot.

Preparation for Winter: Storage of reserve food in root, stem, leaf and seed; study of winter buds, their arrangement, structure and means of protection; the fall of the leaf; interpretation of leaf and scale scars on trees and shrubs.

Winter Term.

Seeds and Seed Germination: The study of germinating seeds of bean or squash, corn or wheat, acorn or horse chestnut, pine or spruce, observing the markings and parts of these seeds, and the changes in the parts during germination; discussions of the functions of the parts of the seed and of the most suitable conditions for the germination of seeds.

Plant Structures: Structure of the stems of herbaceous dicotyledons and monocotyledons studied by the aid

of a hand lens; study of a stomate and a plant cell from a thin preparation of the surface of such leaf as fern, tradescantia or lily, under the low power of a compound microscope; observation of lenticels, study of a young root showing roothairs and mode of branching.

Experiments: Simple experiments illustrating osmosis, the application of this force in explaining the absorption by plant roots; simple experiments illustrating capillarity, the application of this force in explaining movements of water in soil; experiments to show the presence of soluble and insoluble materials in soils; experiments to illustrate leaf-functions, e.g., transpiration, manufacture of starch in sunlight, disappearance of starch in darkness, exhalation of a gas by green plants, demonstration of the presence of chlorophyll. Simple experiments to illustrate stem-functions, e.g., conduction of cell-sap, heliotropism, wilting of plants, rooting of cuttings of house plants, testing for starch in tubers, seeds, etc., simple experiments to illustrate region of growth of young roots.

Ferns: General structure and habits of a common fern.

Wood Sections: Study of cross sections of a common tree, such as an elm or a cherry, noting pith, annual rings, heart-wood, sap-wood, cambium, bark, medullary rays.

Supplementary Studies: The reading of articles on such economic problems as the following:—Improvements of varieties of plants, competition in plant colonies, why weeds are hard to eradicate, uses of plants for food, clothing, building, medicine, paper, etc. Class discussion of the above problems.

Spring Term

Forestation: How to plant a tree; principles of tree pruning; propagation of trees by seeds, budding, grafting, cutting, and coppice growth; importance of reforestation.

Plant Identification: Identification of plants continued. Sufficient practice should be given in the use of the key to enable the pupils to identify the common flowering plants of the locality.

Spring Plants: Relation of flower structure to mode of pollination; meaning and value of cross-pollination; spines, prickles, tendrils, underground parts, their forms and uses.

ZOOLOGY.

The general scope of the work in Zoology is as follows:—

Indoor Study of Living Animals: The teacher's immediate responsibility lies in the laboratory work which embodies simple morphological studies of common forms, representing the chief animal types. These studies must, wherever possible, be supplemented or preceded by observation on living specimens. For this purpose, provision will be needed for suitable aquaria and vivaria, where the moving, breathing, and feeding of the living animals may be within ready view of the pupils. **These morphological studies are not to end in the study of form, but accompanying the observation of the form there must be a constant effort to interpret the meaning of the form, to show the relation of form and function.**

Outdoor Work, which will of necessity vary with the locality, must be carried on to a very large extent without the teacher's direct supervision. But the teacher should encourage and direct the pupils, devoting a fair portion of the time of the class to discussions and reports on their independent work. Arrangements should be made for field excursions on suitable occasions.

School Museum: For progress in the natural history side of the subject, the equipment detailed below should be provided. The school museum should be a thing of gradual growth, and great care should be taken in the selection of the material.

Supplementary Reading: For general reading and discussion the following additional topics are suggested:—the humane treatment of domestic animals; the conservation of wild animal life; destructive mammals; relation between plants and insects; interdependence of the plant and animal kingdoms; farming of fur-bearing animals.

DETAILS OF THE COURSE.

The course in Zoology as outlined below is based on Coleman's Beginners' Zoology, which is to be used as a text-book by the pupils and also as a book of reference, as it contains matter beyond the limits of the course.

Arthropods:

1. Insects (a) Study of the main external features and of the life-history of a grasshopper.
 - (b) Comparison of a grasshopper with a spider and a centipede or a millipede, as to main external features.
 - (c) Description, life-history, relation to man, and methods of combating four harmful insects:—Colorado-

potato beetle, codling moth (or cabbage butterfly), mosquito, house fly (or bot fly).

- (d) Description, life history and relation to man of the following beneficial insects:—honey bee, dragon fly, silk worm.
- (e) Recognition-characters of the principal orders of insects.
- (f) Brief discussion of the principal insect pests of the locality.

2. Crustaceans:—crayfish, external features with special reference to the organs and modes of breathing, walking, swimming and securing food.

Earthworms: External features, food, habits, economic importance.

Molluscs:

1. **Clams:** Shell, composition and internal and external markings, gills, foot and siphons, observation of live specimens.
2. **Slugs or Snails:** External features, observation of live specimens.

Fishes: External features, gills and mode of breathing, feeding habits. Economic importance of fish, chief food-fish of Canada, fish-hatcheries, laws protecting fish.

Amphibians: Frogs: Life history, external features, economic importance of toads and frogs.

Reptiles: Turtles and snakes: Chief external features, discussion of the habits and economic importance of snakes.

Birds: External features; study of feathers, adaptations for flight, including those of the skeleton; importance of birds; protection of birds; migration of birds; recognition of twenty common birds, including some winter birds (i.e., how to know them when they are seen); comparison of the bills and feet of different types of the birds of Ontario as related to their life habits.

Mammals: External features of a cat or a rabbit; skeleton of cat or rabbit; teeth of the following mammals as related to their life habits (a general idea of position and form):—cat, rabbit, bat, horse, cow; feet of the following mammals in relation to their life habits:—cat, dog, bat, mole, beaver (or muskrat), horse; uses of mammals to man from pupil's experience and reading, (food, clothing, work, etc.); recognition of the common wild mammals of the locality and discussion of their habits.

Laboratory Equipment for Botany and Zoology

For practical work in Lower School Botany and Zoology each student should be provided with the following:—

- 1 Pocket Magnifier.
- 2 Dissecting Needles.
- 1 Pair Dissecting Forceps.
- 1 Dissecting Scalpel or sharp Pocket Knife.

The apparatus for conducting experiments in physiology is described in the authorized text-books.

For Upper School Biology compound microscopes are essential; also dissecting sets and pans.

The following provisions apply to both the Upper and the Lower School Biology:

Aquaria

Aquaria of almost any desired form and price may be had from the dealers in school apparatus. Constant attention is necessary to ensure the best conditions in the aquarium, and the instructor should take pains to inform himself on the points requisite for good management.

Skeletons

While special study of the skeleton is prescribed only in the case of the mammal, it is nevertheless desirable to have at hand the skeletons of other vertebrate forms included in the course. A very satisfactory collection, including the cat, perch, frog, snake, turtle, and crow, is supplied by the dealers. The smaller schools should provide the cat or dog skeleton, and add the others by degrees.

Mounted foot bones of various types, such as pig, horse, sheep, rabbit, dog, and mole, are very useful.

Preparations Preserved in Fluids

Preparations illustrating the different stages in the development of the frog, the snake, and the fish are extremely useful. The smaller schools should be provided with at least the first named.

Admirable preparations of dissected specimens of the fish, frog, crayfish, fresh water mussel, earthworm, and other types can be obtained from the dealers. The museums in the larger schools at any rate should have examples of these preparations.

Bird Skins and Mounted Birds

A collection of birds is indispensable in all the schools. There should be specimens of at least twenty representative birds of the locality, selected to show, among other things, the different types of feet and bills. Both mounted specimens and bird skins will be found useful for class study.

Mammals

The museum in every school should contain stuffed specimens of a few representative wild mammals of the locality.

Insects

A standard collection of insects, representative of the different orders, should be provided in every school. Such a collection can easily be accumulated by the pupils themselves under

the teacher's direction, and special care should be taken to guard it against injury. A fair value will be allowed for deserving collections made in this way.

Cabinets

For the proper preservation of skeletons, mounted birds, insects, and other dry museum specimens, dust-proof cabinets are essential. These should be constructed partly as glass-fronted cases with shelves, and partly with well fitted drawers which, however, will serve other purposes as well.

Museum Jars

As already suggested, specimens illustrating the general fauna of the locality should be collected, carefully preserved, and added to the museum. To accommodate the collections preserved in fluid, suitable jars are a necessity. These can be had from the dealers in considerable variety. Those known as "Crown" sealers, in pint and quart sizes, will answer most purposes; but jars with flat sides exhibit the contents to better advantage. Such jars, however, are more expensive.

Botanical Material

For botanical work, it is highly desirable that the pupils themselves should be encouraged to collect the material needed. A suitable cabinet with drawers is necessary for the herbarium, which should have a place in every school museum. The specimens kept in the herbarium should be carefully selected and mounted, and the whole should form a standard for the guidance of the pupils in this branch of their work.

Standard collections of woods should also be kept on view, and it serves a good purpose to have mounted on large sheets specimens illustrating special points, such as provision for seed dispersal, varieties of stem-forms, etc.

A collection of woods showing the depredations of destructive insects would be very instructive.

AGRICULTURE AND HORTICULTURE

LOWER SCHOOL

Regulations.

1. (1) Schools intending to undertake for the first time or to continue the work in Agriculture and Horticulture and thus qualify for the entire annual grants, shall notify the Deputy Minister at as early a date as possible before Decem-

ber 31st, or before September 15th for such schools as make a beginning at the commencement of the school year. This notice shall be signed by the Chairman of the Board as well as by the Principal.

(2) (a) The work shall not be undertaken unless there are at least six pupils in regular attendance in the class of each year.

Note:—While only six pupils are required in order to commence the work, it is very desirable that as many as possible of the pupils of the classes concerned should take it up. Principals and Boards of Trustees are urged to use their influence to this end, particularly in the case of pupils who might profitably take up the work.

(b) The instruction shall be given by a teacher who holds the degree of B.Sc. (Agr.), a Specialist's certificate in Agriculture, or an Intermediate certificate in Agriculture.

(3) The time allotted to the work shall amount to at least two hours a week during the year for the class of each year in the Lower School, under the personal supervision of and instruction by the teacher; a definite time must be allotted for the work of instruction, satisfactory to the Director. When authorized by a resolution of the Board, any time taken for the instruction of the classes before or after the regular school hours or on Saturdays may be counted.

(4) It is not necessary that the pupil should carry on the practical work at his own home. In some cases he may arrange to undertake some line of work in a neighbor's field or garden, for which he may accept payment; or he may carry out the work in one of the experimental plots at the school; neither is it necessary that the pupils should perform all the work alone.

(5) The work to be undertaken by the pupils as home projects should be considered and selected early in the course so that there may be sufficient time for reading up on the subject and maturing plans. In assisting a pupil to select a project, his age and home interests should all be considered. The aim should be to choose some project which can in all probability be carried through successfully. The pupils in each class should be restricted to a limited number of undertakings, and groups of pupils should work at some common projects. The work may be carried out through the organization of a **School Progress Club**, in which case the number of projects will be best limited to a very few. A number of projects have been outlined in the course of study, but only a few should be undertaken in one year by the pupils in a class. Some of the simpler projects or those requiring only a short period in which to carry them through, should be supplemented by others. Generally speaking, the project which involves careful attention through a period of some length should yield the largest educational returns.

(6) Throughout the year the teacher shall record on a special form to be provided by the Department of Education, the instruction given in the school, and the practical work carried on

in connection therewith. At the end of December these records shall be forwarded by the teacher as a report to the Minister of Education.

(7) (a) Records of the instruction given in school and the practical work carried on in home projects or in school plots shall be kept systematically by the pupils also. These records should be kept in some uniform system, preferably in a loose-leaf note book, and shall be available for inspection.

(b) The collections of economic plants, insects, and weed seeds, made in connection with the work, shall also be available for inspection.

(c) In projects that have a commercial side to them, the records should show the time spent on the work and the value of the products.

(8) For guidance in carrying out the course the teacher should apply to the Director of Agricultural Education, Department of Education, Toronto, and for the circulars, to the Deputy Minister of Education.

Course of Study.

First Year Course.

Bacteria: What they are and where they occur.

Relation to

Foods: Experiments to show pasteurization and sterilization of milk and of canned foods.

Water pollution: Purification of water by boiling; use of chloride of lime as a disinfecting agent.

Infectious diseases, e.g., tuberculosis, typhoid fever, diphtheria; discussion of the agents of infection such as house-flies, drinking cups, etc.

Gardening: Work in home gardens arranged; plans for home gardens; preparation, care and uses of hotbed and cold frame; preparation of soil; methods of growing early vegetables such as potatoes, onions, rhubarb, lettuce, cabbage, tomatoes; methods of growing strawberries, currants; selection of varieties of plants; planting tables; care of growing plants; preparation and planting of experimental and demonstration plots in school garden.

Botany: Parts of a plant such as root, stem, leaf, flower, flower-cluster; field study of weeds; recognition of fifteen common weeds; habits of growth, methods of seed distribution and principles of weed eradication; study of typical composites, e.g., dandelion, sunflower, chicory, etc.; collection of weed seeds.

The study of

- (a) Roots—e.g., corn, grass, sweet clover, carrot.
- (b) Stems—e.g., sunflower, mallow, ivy, bindweed, couch grass.

- (c) Foliage—e.g., corn, beet, bean, horse-chestnut.
- (d) Common types of inflorescence—e.g., mustard, plantain, carrot, clover, dandelion.

Arrangement of leaves with respect to light; functions of leaves; absorption of solutions by roots; movement of liquids through plants.

Seeds and Seed Germination: The study of germinating seeds of bean or squash, corn or wheat, acorn or horse-chestnut, pine or spruce, observing the markings and parts of these seeds, and the changes in the parts during germination; discussion of the functions of the parts of the seed and of the most suitable conditions for germination of seeds.

Entomology: External structure of grasshopper, butterfly and beetle; characteristics by which insects are distinguished from other closely-related invertebrates and these again from one another, based on the study of a grasshopper, a spider, a millipede (or a centipede); manner in which insects breathe; structure of mouth parts, using for examination a grasshopper and a house-fly or blow-fly; rearing common insects from egg to adult or from larva to adult and egg, with observations on their feeding habits, moulting, metamorphosis (complete or incomplete), rate of reproduction among insects and the ways in which they are beneficial.

Dairying: Milk-testing with Babcock tester; use of lactometer; care of dairy herds; construction of dairy stables; food value of milk, whey and buttermilk; visit to the dairy farms, noting stabling and dairy practice.

Poultry: Types and breeds; incubation, brooding and rearing of chicks; management of poultry in summer; crate fattening; visits to a poultry plant; models of poultry houses.

Bee-keeping: Life history and work of bees; colony studies to learn organization; swarming; construction of hives and methods of handling; management of bees in fall and winter.

Home Projects: Completion of one home project which may be selected from such topics as:—

1. Management of a colony of bees.
2. Making a collection of insects.
3. Making a collection of weeds.
4. Use of Babcock test on a herd during the summer.
5. Management of home plot or garden.
6. Growing and canning fruit.
7. Growing and canning vegetables.
8. Construction and care of a hot-bed.
9. Incubating and raising a brood of chickens.
10. Baking bread for exhibit at school fair.

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11. The production of mangel, turnip or cabbage seed.
 12. The testing of two varieties of a vegetable.
 13. The testing of the value of a commercial fertilizer.

Note:—The work of the home projects should be commenced during the first year of the High School course and may be completed in that year or in the second year. At least one project will have been completed before the end of the second year.

Second Year Course.

Botany: Study of grasses with special reference to their economic importance; methods of collecting, mounting and labelling plants; study of ten noxious weeds of the locality, preferably ten of those mentioned in the Seed Control Act.

Fungi: Recognition, life history and saprophytic habits of mushroom, puff-ball, polypore; recognition, economic importance and control of the following parasitic fungi: grain rust (*Puccinia graminis*), loose smut of oats or corn smut, apple scab and black knot.

Fruit Growing: Structure and classification of fruits, such as the apple, peach, strawberry; law relating to the grading of apples; grafting and budding of fruit trees; propagation of currants or gooseberries by cuttings; orchard practices and their purposes; pruning, cultivation, fertilizing and spraying; fruit packages and methods of packing.

Trees: Mode of branching; identification by means of leaves, buds and bark; chief commercial uses of one group of the following trees:

- (a) Maple, oak, bass-wood, elm, white pine and cedar.
- (b) Spruce, birch, jack pine, balsam, balm of gilead.
- (c) Ash, beech, hickory, yellow pine, tamarack.
- (d) Maple, elm, horse-chestnut, box elder, mountain ash.

Gardening: Selection, purchase and outdoor planting of bulbs; methods of potting and of forcing bulbs for winter bloom.

Chemistry: Experiments to show:—Chemical changes; the composition of water and of air; the nature of combustion; experiments to distinguish elements, compounds, mixtures and solutions, and to show the characteristic properties of acids, bases and salts; simple experiments to prove that plants contain moisture, carbon and ash; identification of two of the products of combustion of each of the following:—wood, paper, alcohol, coal oil, and of two products of respiration; a simple study of plant substances, testing for starch, protein, carbon dioxide; an experimental study of baking soda and yeast, showing their properties and uses.

Soil: Collection by the students of at least four of the commonest kinds of soil found in the neighborhood, a comparison of these with respect to color, weight, size of particles, stickiness when wet, conditions upon drying, "feel" when dry, capacity for holding water, rapidity of percolation, degree of capillary action; importance of humus; importance of nodules on the roots of certain leguminous plants.

Entomology:

Study of Injurious Insects:—Losses from insects; natural control factors; value of fall ploughing and a short rotation of crops in the control of insect pests; insecticides for (a) biting insects, (b) piercing and sucking insects; life histories and methods of control of the housefly, cutworms and any other two destructive insects; recognition of the orders Orthoptera, Coleoptera, Odonata, Diptera, Lepidoptera, Hemiptera and Hymenoptera; methods of collecting, preserving and mounting insects.

Poultry: Care of eggs; candling eggs; egg preservatives; Canadian egg laws; egg circles.

Farm Animals: Types and breeds of cows, horses, sheep and swine; visits to stock farms.

Study of Meats: Relative values of cuts of meat.

LATIN AND GREEK.

The Ontario High School Latin Book up to page 220.
Greek begun in the second year.

Note:—Throughout the course in Latin and Greek the main objects should be accuracy of knowledge of forms and syntax, accuracy of translation into idiomatic English, and the ability to translate at sight. Attention should also be given to pronunciation and oral reading and to the consideration of Latin and Greek words as the roots of English words.

FRENCH AND GERMAN.

SPANISH AND ITALIAN.

The introductory Grammars and Readers, including introductory work in authors. The work in French should at first be wholly without a text-book, for the training of the ear and the tongue. At the beginning the emphasis should be placed on oral work, care being taken to secure accurate pronunciation. This will lead to systematic study of sounds, though not

necessarily nor preferably by means of phonetic transcription. The oral course should be graded, so that the pupil may be constantly increasing his knowledge of names of common objects, states and actions. Easy sight reading at this stage will lend interest to the work; and occasional exercises in dictation will assist the learner in word recognition. At this stage, too, simple points of grammar should be learned incidentally. After about two months of this work the Grammar should be used as a text-book; but throughout the course French should be used as far as possible by teacher and pupils as the medium of conversation.

The other modern languages should be begun in the same way. Where desirable, owing to local conditions, German may be begun first. But as a general principle, no two modern languages should be begun in the same year.

In the Lower School course at least 30 lessons of the High School French Grammar and 23 lessons of the High School German Grammar should be covered.

BUSINESS PRACTICE.

Note:—The purpose of this course should not be to produce bookkeepers, but to give useful information regarding such business papers and procedure as the pupil may meet with in after life in conducting his own affairs. This purpose should be kept in mind by the teacher in working out the sets in bookkeeping. The emphasis should be placed on the business usages and forms rather than on the actual recording. It is suggested that blank forms of all business papers and documents should be secured by the teacher so as to make the topical discussions as practical as possible.

Penmanship

The writing of exercises designed to secure freedom of movement and correctness of form of the figures and of the letters of the alphabet, as outlined in Book 3 of the Ontario Writing Course.

The writing and ruling of ledger headings and accounts, and business forms. To give effect to this, the exercises set for practice in Book 3 of the Ontario Writing Course should be extended by the addition of a sample of a ledger heading properly set up, a ledger account with pin head figures shown, the same properly closed and ruled off, and a sample of each of the following business forms:—a cheque, a draft, an invoice, and an order, to be taken from the sets prescribed for bookkeeping, with a reference to their place of origin.

Note:—At least 10 minutes of each lesson in Business Practice throughout the course should be devoted to penmanship.

Bookkeeping.

The preliminary exercises of the Ontario School Bookkeeping, Part I, and a knowledge of the business forms and usages in connection therewith.

Sets 2, 3, and 4 or 5, of the Ontario School Bookkeeping, Part I. All the business forms of each set should be written out and filed before, or at the same time as, the records of the transactions in the set are made, and sufficient explanation of the business usages given by the teacher to enable the students to obtain a definite knowledge of the form and use of each form. The records should include the general journal, cash book, ledger entries, closing of the ledger accounts, and the making of the necessary financial statements.

Notes:—1. Teachers are recommended to use some simple method of arranging the business papers of each set, either in a box or drawer with small compartments, or in large manilla envelopes.

2. Teachers should also illustrate practical forms, such as expense account in cash book form, and tradesmen's personal accounts in ledger form or in counter check books.

Business Forms and Usages.

A definite knowledge of the form and use of receipts, postal notes, express orders, post office orders, promissory notes, Dominion and bank bills, joint notes, joint and several notes, orders for money and goods, deposit slips, cheques, bank pass books, drafts, invoices, credit invoices, statements of account, monthly statements, endorsement, acceptance and consequent liability.

An explanation and discussion of leases, contracts, partnership agreements, agreements of sale, deeds, mortgages, lien and instalment notes, bills of lading, wills, and powers of attorney. Printed forms of the foregoing should be secured by the teacher and read to or by the students in the discussions.

STENOGRAPHY AND TYPEWRITING.

The principles of Shorthand as set forth in the Isaac Pitman Course in Shorthand, or Isaac Pitman Rapid Course in Shorthand, with particular attention to learning the rules and acquiring a good style of notes.

Reading simple stories.

Writing to dictation.

Transcription.

Mastery of the complete keyboard by the touch method, and a speed of 10 net words per minute, as shown by a five-minute test from a simple prose passage not practised before, two words to be deducted from the gross number typed for every deviation from the copy.

VOCAL MUSIC.

Lower School.—First Year.

Tune: Drill in singing from the Tonic-Solfa, or Staff, Modulator, exercises containing the tones of the Major and Minor Scales, in all keys, with simple modulations.

Time: Simple and compound Duple, Triple and Quadruple Measures, containing pulse divisions of halves, quarters, thirds and rests, in varied combination.

Sight Singing: Musical sentences in two and three parts, combining the elements of Tune and Time described above.

Songs: Three-part songs containing a lower part adapted to the needs of boys whose voices have changed.

Ear Training: Writing, or naming the notes of short musical phrases, based on the Major and Minor scales, when sung or played by the teacher.

Voice Training: Exercises in breath control, vowel production and enunciation of consonants.

Musical Theory: The Treble and Bass clefs, names of lines and spaces, key and time signatures, intervals of the Major scale, and marks of expression.

Second Year.

Tune: Continuation of the studies in Tune prescribed for Form I with the addition of the tones of the Chromatic Scale and more advanced modulations.

Time: Continuation of the studies in Time prescribed for Form I with the addition of analysis of Musical Form and Phrasing.

Sight-Singing: Musical sentences in two, three and four parts, combining the elements of Tune and Time described above.

Songs: Three and four-part songs and choruses, with lower parts for Tenor or Bass voices.

Ear Training: Writing, or naming, the notes of short musical phrases, containing simple chromatic progressions, when sung or played by the teacher.

Voice Training: Extension of the studies prescribed for Form I.

Musical Theory: Treble and Bass clefs, Key and time-signatures, diatonic and chromatic intervals, and the elements of Vocal Physiology.

Choirs or choral societies should be formed in co-operation with the School Literary Societies and should be trained at such times as may be arranged by the Principal. Lectures on musical subjects should also be given, illustrated by vocalists, pianists or victrolas.

MANUAL TRAINING.

First Year.

Drawing: Simple plans and elevations. Correct use of drawing board, T-square, triangles and compasses. Construction of the common geometrical figures. Simple lettering and figuring. Working drawings of objects made, either full size or to scale.

Wood Work: Growth, structure and identification of the woods used in the manufactures of the locality. Warping, twisting, checking; how caused and counteracted. Making of simple objects according to drawings previously prepared. Proper use of nails, screws, and glue. Use of simple joints in articles made; for example, end half lap, centre half lap, mitre, housing. Use and mechanical construction of common wood-working tools as exemplified in the making of a series of useful objects. Construction of simple school apparatus.

At least every alternate piece of work shall be kept for inspection.

Second Year.

Drawing: Elementary orthographic and isometric projection. Simple sections. More advanced geometrical drawing. Freehand dimensioned sketches. Inking, tracing, lettering, and blue printing. Working drawings of objects made.

Wood Work: Growth, structure, and identification of the woods used in the locality. Tool sharpening. Common joints used in various kinds of wood work—scarfing, simple dovetail, mortice and tenon, tongue and grooved joint—their use in making objects such as boxes, drawers, tables, book-cases, etc. Fastenings with dowels, pins, cleats, wedges, etc. Calculations from drawings and specifications of lumber required for articles made and cost.

At least every alternate piece of work shall be kept for inspection.

Various methods of finishing, as staining, fuming, filling, shellacking, oiling.

Wood Turning: Explanation of the lathe, its action, speed, parts, care, and use. The gouge, correct position, turning rough cylinder. The skew chisel; reason for grinding both sides and at an angle. Concave surfaces with skew chisel. Irregular curves and spindle work. V grooves, beads and hollows. The introduction of hard wood and sand paper, exercises in turning handles. Face plate turning, chuck work, boxes with covers, powder box, napkin ring, goblet, etc.

Every piece of work shall be kept for inspection.

Forging: The forge, the fire, the heat, the height of anvil, and its position. The ordinary tools, how to use and care for them. Hammer, sledge, chisel, fuller, and swage. Drawing, forming, upsetting, bending, and twisting iron, stamping and forge-blacking the finished piece, exercises of simple design and construction, gate hook, turning eye and hook. Scarfing, bending, and welding.

Every piece of work shall be kept for inspection.

Machine Shop Practice: Simple ornamental work in brass, copper, and iron. The making of simple objects such as watch fobs, paper knives, blotter corners, trays, bowls, etc.

Simple chipping and filing. Use of measuring and marking tools; soldering and brazing.

An elementary study of the engine lathe; its parts, adjustment and working. Proper tool angles and cutting speeds and feeds. The exercises taken should, where possible, involve completed objects.

Every piece of work shall be kept for inspection.

HOUSEHOLD SCIENCE.

First Year.

The extent of the review of the course of Form IV and the length of time spent on it must be determined by the work previously taken by the pupils, but the following should be assured.

Cleaning: Best methods of cleaning dishes, dish-towels, sinks, wooden surfaces, steel, nickel, silver, aluminum.

Cookery: Construction and care of a practical stove.

Practice in cooking milk, eggs, meat or fish, fruit, vegetables, cereals.

Principles involved in flour mixtures.

Principles involved in the preservation of food.

Foods: Food elements in milk, eggs, meat or fish, fruit, vegetables, seeds. Planning simple home meals.

The House: This subject is taken more to form new bases of thought than to give definite knowledge. It is intended that two or three lessons shall, in a very general way, cover the following points:

Site:—Soil, sun exposure, environment.

Plan:—Material, number, size and relative position of rooms.

Lighting:—Candles, coal-oil, gas, electricity, considered from standpoints of lighting-power, heat, vitiation of air, care and cost.

Heating:—Fire-places, stoves, hot-air and hot-water furnaces considered and compared.

Ventilating:—Sources of house-air impurities, purpose of ventilation, simple home methods.

Sanitation:—Principles involved in the sanitary care of the house and premises.

Furnishings:—Material, form, colour, care required when in use.

Home Nursing: Review of the course for Form IV of the Public Schools. The course may be extended if time permit.

Note:—Where no equipment is provided a doll's bed may serve.

Laundry Work: Necessary materials:—Water, alkalies, soap, bluing, starch, and the action of each.

Processes in the washing of white clothes, coloured clothes, woollens.

Note:—The above subjects are intended to be taught simply (not technically). In schools where there is no laundry equipment, the order of work may be developed in class and the practice carried out at home.

Sewing: Review and extension of the course of Form IV, as far as the condition of the pupils' knowledge necessitates, using finer materials.

Household Linen:—Making towels and sheets, hemming table-cloths.

Underclothes:—A simple dress or kimona or shirt-waist (machine or hand made). Use of the machine optional.

Second Year

Cookery, Foods: Review of the First Year course and its extension to more advanced cookery.

Note:—In the advanced cookery, the dishes should be chosen according to the demands of the home life of the pupils.

Marketing: Seasons for domestic and well-known imported foods. Current prices of food, with practice in buying.

Note:—If possible, markets and shops should be visited, and pupils given the responsibility of buying home and school supplies.

Entertaining: Writing invitations and replies.

Planning and preparing for guests.

Duties of hostess and guests.

Note:—In school, one theoretical and one practical lesson will be sufficient for this. Additional practice may be obtained in entertaining at home.

Household Accounts: Systematic spending of the income.
Keeping account of household expenses.

Sewing: Advanced stitches applied to small garments.

Hemmed patch, fine mending.

Instruction in the use of patterns.

Cutting out and making simple garments.

Threading, running, oiling and cleaning of sewing machines; use of attachments optional.

THE COMMERCIAL COURSE.

As the Commercial Course for High Schools and Collegiate Institutes is intended to suit local needs, it is provided that the pupils be given a general High School education, together with a special training in the more purely commercial subjects, such as may be required.

Obligatory Subjects.

The following subjects of the Lower School Course are obligatory on all pupils taking the Commercial Course:—

1. English: Literature (to include Oral Reading), Composition (to include English Grammar and Business Correspondence), and Spelling, through two years.
2. Canadian History and Civics, and Geography (each one year and not concurrently).
3. Arithmetic (through two years).
4. Penmanship (through the first year). Penmanship and Business Law alternating through the second year.
5. Bookkeeping and Business Forms (through two years).
6. Shorthand (through two years).
7. Typewriting (for one or two years).

Optional Subjects.

8. Algebra or a modern language (through two years).

Note:—If desired, the Principal may stress either Shorthand or Bookkeeping during the second year, and the other subject (e.g., Bookkeeping or Shorthand) may be proportionately lightened.

Bookkeeping

First Year.

A definite knowledge of the form and use of receipts, promissory notes, drafts, orders for money, orders for goods, deposit slips, cheques, bank pass books, invoices, postal notes, post office money orders, express money orders, Dominion notes, bank notes, bank drafts, joint notes, joint and several notes, endorsement, acceptance and consequent liability, credit invoices, statements of account, monthly statement.

Double Entry involving the use of Journal, Cash Book, Bill Book, Invoice Book, Sales Book, Ledger.

Financial Statements including Statement of Losses and Gains, Summary of Capital Account, Statement of Assets and Liabilities.

Closing the Ledger.

Single Entry and changing from Single Entry to Double Entry.

Note:—The foregoing is to be studied in connection with the working out of the exercises and sets 1, 2, 3, 4 or 5, 6 or 7, 8, 9, 10, 11 of the Ontario School Bookkeeping, First Course.

Second Year.

Review of Single and Double Entry and changing from Single to Double Entry.

Use of General Journal, Cash Journal, Sales Journal, Purchase Journal and Bill Journal, all as books of original entry and with various special columns. Partnership and the sharing of profits by different methods. Bookkeeping for a commission business.

The use of drafts, banking transactions, deposits, withdrawals, discounts, collections, freight, duties, discounts, bank and bad debts account. Division of merchandise and expense accounts into various subordinate accounts.

Trading Account, Profit and Loss Account, and Balance Sheet, with percentage calculations.

Note:—The foregoing is to be studied in connection with the working of the exercises and sets 1, 2, 3 (at least one month's transactions), and 8 of the Ontario School Bookkeeping, Second Course.

Business Law and Usage

First Year.

Business forms and usages will be taken with the Bookkeeping in the First Year.

Second Year.

Sources of law; contracts: kinds, forms, parties, consideration, agreement, interpretation, discharge; negotiable paper: endorsement, acceptance, discharge, dishonour, protest, payments: how made, application of payments, legal tender; Statute of Frauds; Statute of Limitations: application to accounts, professional fees, rents, notes, mortgages, judgments, dower, easements; leases, deeds, mortgages, agreements of sale, lien and instalment notes, bills of lading, powers of attorney; partnership: kinds, formation, dissolution, and the duties, powers, and liabilities of partners; wills.

Office courtesies; telephone; incoming and outgoing mail; indexing and filing; use of directories and books of reference; express, postal, telephone, and telegraph information.

Shorthand

First Year.

The principles of Shorthand as set forth in the Isaac Pitman Course in Shorthand or Isaac Pitman Rapid Course in Shorthand, with particular attention to learning the rules and acquiring a good style of notes.

Reading simple stories.

Writing to dictation.

Transcription.

Second Year.

The course of the First Year continued.

Reading of at least one book in Shorthand for the purpose of acquiring a good style, such as: A Christmas Carol, by Charles Dickens; The Sign of the Four, by A. Conan Doyle; Around the World in Eighty Days, by Jules Verne, etc.

Note:—The aim of the course should be to acquire a speed of 80 words per minute in Shorthand, and the power to transcribe on the typewriter at the rate of 12 words per minute.

Typewriting.

First Year.

Mechanism of the Typewriter:

Names and uses of the parts employed in the elementary operation of inserting, strengthening, and holding the paper in position, moving the carriage to the right and to the left, setting the margins, spacing between words, spacing between lines, returning the carriage, typing an additional letter at the end of a line, capitalizing, etc.

Touch Method:

It is suggested that some mechanical aid be used, such as keyboard shields, aprons or blank keys.

Material for practice should lead to a progressive knowledge of the keyboard, with proper fingering for the same, and should lay the foundation of accuracy upon which speed will later depend.

Scope of Work:

Mastery of the complete keyboard, and speed of 10 net words per minute, as shown by a five-minute test from a simple prose passage not practised before, two words to be deducted from the gross number typed for every deviation from the copy.

Second Year.

Mechanism of the Typewriter:

Names and uses of parts employed in expert manipulation of the machine for such operations as typing on ruled paper, typing outside the margins, stencil-cutting, centering, using a bichrome ribbon, tabulating, putting on a new ribbon, reversing a ribbon, etc.

Care of the Machine:

(1) Cleaning—Use of long-handled brush, type brush, needle, and cheesecloth wiper; (2) Oiling.

Typewriting letters on letterhead, memo., and note paper, and postcards. Artistic arrangement of work typewritten on various sizes of paper. Transcription from prepared shorthand and from dictated shorthand. Addressing envelopes, post-cards, and wrappers. Folding and inserting, mailing and registering; postal information.

Speed of 30 net words per minute, as shown by a 10-minute test from a simple prose passage not practised before, five words to be deducted from the gross number typed for every deviation from the copy.

Arithmetic.

Weights, measures and currency of Canada, the British Isles and the United States.

Vulgar fractions, decimals; percentage; trade discount, loss and gain, commission and brokerage, insurance, taxes, duties, simple interest, bank discount, Canadian exchange.

Special drill to secure accuracy and rapidity in calculation; the four simple rules, especially vertical and cross "tots"; extension of bills and invoices; percentage; interest and discount; "short cuts".

Partnership settlements, stocks, partial payments, equation of payments, commission and brokerage, compound interest, and foreign exchange.

In completing this course frequent oral drills and reviews should be taken.

Notes:—1. A course in mensuration may be given to suit local needs.

2. In the treatment of Arithmetic generalized symbols of Algebra may be used.

Geography.

Studies of the various conditions and factors affecting production, trade and commerce. A special study of local industries.

The Dominion of Canada as a commercial unit; the east, middle, and west; natural products and surplus productions of each section; interprovincial commerce; power distribution; location of steam and electric railway and steamship routes, grain elevators, cold storage warehouses; use of refrigerator

cars, stock yards, etc.; summer and winter ports; exports to and imports from both Atlantic and Pacific countries.

Trade and Commerce with the British Empire, the United States, Central America, Mexico, South America, Europe and Asia; their chief natural and manufactured products; competition of these for Canadian and overseas markets.

Algebra.

The Algebra of the Lower School Course.

Modern Language.

The French, German, Italian or Spanish of the Lower School Course.

MIDDLE SCHOOL SUBJECTS.

ENGLISH COMPOSITION.

The course of the Lower School in oral and written composition continued and extended.

The study of models of prose-writing systematically taken up towards the close of the course.

Greater attention to the development of literary style.

Notes:—1. Good composition in all written work should be demanded by every teacher.

2. The Debating and the Literary Society should supplement the work in this subject.

ENGLISH LITERATURE.

Intelligent and appreciative study of suitable authors, both prose and poetry, including those prescribed for the Departmental and University Examinations.

Systematic oral reading by the pupils of the texts studied in the class.

Supplementary reading provided by the pupils themselves or supplied from the school, public, or other library.

Memorization and recitation of choice selections in prose and poetry prescribed by the Department and of others made by the teacher.

Note:—At this stage, the pupils begin to appreciate literature as such. Besides supplementary reading of the same character as that taken up in the Lower School, other works of a subjective character may be added. The purpose and the spirit of the author and the merits of his thoughts and style should now be dealt with in a general way; his defects should not be emphasized. The chief object is still the cultivation of a taste for good literature, and the authors should be read partly in class and partly at home, both silently and aloud.

BRITISH HISTORY.

1688-1920.

Notes.—1. For the Middle School examination the following sections of the course given below are obligatory, viz., 1, 4, 5, 6, and 15. Candidates must also take one of the options in each of (a) and (b) below, viz:—

- (a) Section 2 and section 3; or section 13 and section 14.
 - (b) Sections 7, 8 and 9; or sections 10, 11, and 12.
2. The course in British History includes the geography relating to the history prescribed.

The following are the details of the course:—

1. Political development 1688 to date:

The Bill of Rights; the significance of the Revolution of 1688.

Origin and development of parties and party government.

Biographical sketches of the great Prime Ministers: Walpole; Pitt, Jr.; Grey; Russell; Melbourne; Peel; Palmerston; Gladstone; Disraeli; Salisbury; Balfour; Asquith; Lloyd George.

Extension of the franchise:—The Reform Bills of 1832, 1867, 1884, 1918, etc.

Restriction of the powers of the House of Lords.

2. The American Revolution.

3. The French Revolution; the war with France, 1793-1802; the struggle with Napoleon.

4. The Industrial Revolution.

5. The development of the British Empire in territory and in government.

6. The social life of the people:

- (a) Phases:—agriculture, commerce, industry, transportation, class distinctions, amusements.
 - (b) Legislation, e.g., Factory Acts.
7. Literature.
 8. Education in the 19th and 20th centuries.
 9. Religion.
 10. Ireland.
 11. External relations, including brief study of nations concerned.
 12. The British Navy. The place of sea-power in the development and maintenance of the British Empire.
 13. The Great War, especially the part played by the British Empire.
 14. The League of Nations.
 15. Civics:
 - Government, with special emphasis on provincial, federal, and imperial government.
 - A study of the following aspects of the production and distribution of wealth:
 - (a) The dependence of the citizen upon others for the wealth he uses.
 - (b) Co-operation and division of labour.
 - (c) The effects of industrial development upon community life.
 - (d) The distribution of wealth in wages, salaries, profits, dividends, interest, and rent.
 - (e) Saving.
 - (f) What the government does to regulate the production and distribution of wealth.
 - (g) Voluntary organizations aiding or regulating industry.

BOOKS OF REFERENCE.

The following books will be found useful for supplementary reading on the topics of the course, and should be placed in every High School library:

Mowat, A new History of Great Britain, Parts II and III, Oxford Press.

Gardiner, A Student's History of England, Longmans.
(or Part III, which deals with the period 1689-1919).

McCarthy, England in the Nineteenth Century, 2 vols., Putnam.

Trevelyan, British History in the Nineteenth Century,
Longmans.

Bell's English History Source Books, Vols. VII-XI,
1714-1887, G. Bell & Sons.

Kendall, Source Book of English History, Macmillan.

- Piers Plowman Social and Economic Histories, Vols. V, VI, VII, George Philip & Son, London.
- Cheney, Industrial and Social History of England, Macmillan.
- Hamilton, How the Fight was Won, Ontario Department of Education.
- Everyman's Literary and Historical Atlas of Europe, Dent.
- Philip's Junior Historical Atlas, George Philip and Son.

ANCIENT HISTORY.

Note:—The course in Ancient History includes the geography relating to the history prescribed.

GREECE.

I. THE EARLY GREEK WORLD:

- Effects of geographical features.
- Earlier civilizations.
- First period of colonization.
- Homeric age.
 - Story of Troy.
- The City State:
 - Life of the people.
 - Contributions to later Greek civilization.

II. PERIOD OF DEVELOPMENT:

- Colonial expansion.
- Rise of Sparta.
 - Classes of society.
- Government:
 - Aristocratic Constitution.
 - Myth of Lycurgus.
 - Strength and Weakness.
- Rise of Athens to Democracy.
 - Abolition of monarchy.
 - The Aristocracy (General statement only).
 - Draco, Solon.
- The Tyranny:
 - Pisistratus.
- The Democracy (General statement only).
 - Cleisthenes.
- Intellectual awakening.
- The Struggle for freedom:
 - War with Persia.
 - Conquest of Asiatic Greece.

Marathon.
Themistocles.
The navy.
Invasion under Xerxes:
 Thermopylae.
 Salamis.
 Historic importance of Marathon.
Results of struggle on Athens.

III. THE ATHENIAN EMPIRE:

Confederacy of Delos.
Government under Pericles.
The Golden age.
Social conditions of people.
Strength and weakness of Athenian democracy.
Our debt to Athens.

IV. DISCORD AND DECLINE:

The Peloponnesian Wars:
(No details regarding battles).
 Causes: direct.
 indirect.
 First stage:
 Land power versus sea power.
 Death of Pericles.
 Second stage:
 The Sicilian expedition.
 Alcibiades.
 Downfall of Athens:
 Lysander.
 Terms of peace.
Leadership of Sparta (in brief outline):
 Expedition of Cyrus.
 Retreat of the "Ten Thousand."
 Xenophon.
Effects of Spartan violence.
Liberation of Thebes.
 Pelopidas.
 Battle of Leuctra.
Leadership of Thebes:
 Epaminondas.
 Battle of Mantinea.

V. RISE OF MACEDON:

The Country and People.
Philip:
 Thebes and Philip.
 Philip and his army.
 War with Athens.
 Chaeronea.
 Demosthenes.
 Greece under Philip.
Alexander:
 Education.
 Conquests.

Battle of Issus.
Founding of Alexandria.
Battle of Arbela.
Organization of Empire.
Death and Character.
Results of his conquests.

VI. CONTRIBUTION OF HELLAS TO CIVILIZATION:

Art.
Literature
Philosophy.

ROME.

I. EARLY ITALIAN WORLD:

Effects of geographical position.
Physical features of Italy.
Tribes of Italy.
Legendary beginning of Rome (without details of kings).

II. ROME UNDER THE KINGS:

Family life.
Religion.
Social classes.
Government.

III. THE EARLY REPUBLIC:

The Aristocratic Republic.
Struggle with the Plebs.
The Charters of Liberty (without details).
The Twelve Tables.
Licinian Laws.
Hortensian Laws.
The Roman Democracy, (General statement only).

IV. EARLY STRUGGLE FOR EXISTENCE:

Stories of Cincinnatus and Camillus.

V. CONQUEST OF ITALY:

Latin and Samnite Wars.
(No details).
Causes of Rome's success.
Italy organized under Rome (General statement only).
Social conditions.

VI. THE PUNIC WARS:

The First Punic War:
The Carthaginian Empire:
Comparison with Rome.
Struggle for Sicily.
Outline of events.
Results.

The Second Punic War:
The Carthaginians in Spain.
The Invasion of Italy.

Hannibal's victories in outline.
Conquest of Spain by Scipio.
Battle of Zama.
Results of the War.

The Third Punic War:
Destruction of Carthage.
Carthage a Roman province.

VII. THE CONQUEST OF THE EAST:

The Struggle with Macedonia. (General statement only)
Destruction of Corinth.

Greece a Roman province.
War with Syria.

Effects of Conquests:

On art and literature.
On customs and religion.
On social conditions.
On political organization.

Growth of Plutocracy:
Evil effects.
Cato.

VIII. PERIOD OF CIVIL STRIFE—MILITARY RULE:

Causes of strife. (See previous chapter).

The reforms of the Gracchi.

Marius.

The rise of Marius.
Jugurtha.
The social war.

Sulla.

The Mithridatic Wars.
The Sullan Constitution.
First Civil War.
Senate made supreme.

Rise of Pompey:

Sertorius.
Spartacus.
Pompey as consul.
Conquests in the East.
Conspiracy of Catiline.
Cicero.

The first triumvirate.

Rise of Caesar:

Conquests in Gaul.
Second Civil War.
Cause.
Defeat of Pompey.
Caesar's government and death.
Caesar's reforms.

IX. FOUNDING OF THE EMPIRE:

- Caesar's Heir.
- The Second Triumvirate.
- Defeat of Antony.
- Government under Augustus.
- The Augustus Policy.
- Extent of the Empire.
- The Augustine Age.
- Literature.
- Public works.
- Birth of Christ.

BOOKS OF REFERENCE.

The following books will be found useful for supplementary reading on the topics of the course, and should be placed in every High School library:—

- Breasted, Ancient Times, Ginn & Co.
- Botsford, A History of Greece, Macmillan.
- Pelham, Outlines of Roman History, Putnam.
- Havell, Republican Rome, Ballantyne Press.
- Cotterill, Ancient Greece, Ballantyne Press.
- Botsford, A Source Book of Ancient History, Macmillan.
- Munro, A Source Book of Roman History, Heath & Co.
- Fling, A Source Book of Greek History, Heath & Co.
- Translations of the Histories of Herodotus, Thucydides, Polybius and Livy.
- Ginn's Classical Atlas, Ginn & Co.

ALGEBRA.

Lower School course reviewed and continued; extraction of roots; more advanced factoring; simple graphs; simple ratio and proportion; indices and surds; quadratics of one and two unknowns; theory of quadratics.

GEOMETRY.

The course in the Lower School reviewed.
A selection of the leading propositions in Elementary Synthetic Geometry, with exercises and deductions thereon.
The topics of the course are as follows:

CONSTRUCTIONS.

To describe a parallelogram equal to a given triangle, and having an angle equal to a given angle.

To describe a parallelogram equal to a given rectilineal figure, and having an angle equal to a given angle.

On a given straight line to describe a parallelogram equal to a given triangle, and having an angle equal to a given angle.

To find the centre of a given circle.

From a given point to draw a tangent to a given circle.

On a given straight line to construct a segment of a circle containing an angle equal to a given angle.

From a given circle to cut off a segment containing an angle equal to a given angle.

In a circle to inscribe a triangle equiangular to a given triangle.

To find locus of centres of circles touching two given straight lines.

To inscribe a circle in a given triangle.

To describe a circle touching three given straight lines.

To describe a circle about a given triangle.

About a given circle to describe a triangle equiangular to a given triangle.

To divide a given straight line similarly to another given divided straight line.

To find the fourth proportional to three given straight lines.

To describe a polygon similar to a given polygon, and with the corresponding sides in a given ratio.

To find the mean proportional between two given straight lines.

To construct a polygon similar to a given polygon, and such that their areas are in a given ratio.

To describe a polygon of given shape and size.

THEOREMS.

Parallelograms on the same base, or on equal bases, and between the same parallels, are equal.

Triangles on the same base, or on equal bases, and between the same parallels are equal.

Triangles equal in area, and on the same base, are between the same parallels.

If a parallelogram and a triangle be on the same base, and between the same parallels, the parallelogram is double the triangle.

Find expressions for area of a parallelogram, and area of a triangle.

The complements of the parallelograms about the diagonal of any parallelogram are equal.

The square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the sides.

If a straight line be divided into any two parts, the sum of the squares on the parts, together with twice the rectangle contained by the parts, is equal to the square on the whole line.

The square on the side of any triangle is equal to the sum of the squares on the two other sides plus twice the rectangle contained by either of these sides and the projection of the other side on it.

If more than two equal straight lines can be drawn from the circumference of a circle to a point within it, that point is the centre.

The diameter is the greatest chord in a circle, and a chord nearer the centre is greater than one more remote. Also the greater chord is nearer the centre than the less.

The angle at the centre of a circle is double the angle at the circumference on the same arc.

The angles in the same segment of a circle are equal, with converse.

The opposite angles of a quadrilateral inscribed in a circle are together equal to two right angles, with converse.

The angle in a semi-circle is a right angle; in a segment greater than a semi-circle less than a right angle; in a segment less than a semi-circle greater than a right angle.

A tangent to a circle is perpendicular to the radius at the point of contact; only one tangent can be drawn at a given point on the circumference; the perpendicular to the tangent at the point of contact passes through the centre; the perpendicular from centre on tangent passes through the point of contact.

If two circles touch, the line joining the centres passes through the point of contact.

The angles which a chord drawn from the point of contact makes with the tangent, are equal to the angles in the alternate segments.

The rectangles under the segments of intersecting chords are equal.

If OAB and OC be two straight lines, and $OA \cdot OB = OC^2$, OC is a tangent to the circle through A , B , and C .

Triangles of the same altitude are as their bases.

A straight line parallel to the base of a triangle divides the sides proportionally, with converse.

If the vertical angle of a triangle be bisected, the bisector divides the base into segments that are as the sides, with converse.

The analogous proposition when the exterior angle at the vertex is bisected, with converse.

If two triangles are equiangular, the sides are proportional.

If the sides of two triangles are proportional, the triangles are equiangular.

If the sides of two triangles about equal angles are proportional, the triangles are equiangular.

If two triangles have an angle in each equal, and the sides about two other angles proportional, the remaining angles are equal or supplementary.

Similar triangles are as the squares on corresponding sides.

The perpendicular from the right angle of a right-angled triangle on the hypotenuse divides the triangle into two triangles which are each similar to the original triangle.

In equal circles angles, whether at the centres or circumferences, are proportional to the arcs on which they stand.

The areas of two similar polygons are as the squares on corresponding sides.

If three straight lines be proportional, the first is to the third as any figure on the first is to the similar figure on the second.

Questions and easy deductions on the preceding constructions and theorems.

PHYSICS.

A course defined as follows, the topics to be presented experimentally with mathematical applications simple and direct in character:

Sound.

Vibratory motion illustrated with pendulums, rods, strings, membranes, and plates.

Types of wave motion illustrated by water waves, waves in a cord, and waves in a coiled spring.

Production, propagation, velocity, and reflection of sound waves; wave length.

Intensity, pitch.

Laws of vibration of strings; vibration of air in organ pipes; nodes and loops in vibrating strings, and in vibrating air columns, harmonics, quality, manometric flames.

Interference phenomena; beats.

Resonance.

Heat.

Sources of heat: Transformation of other forms of energy into heat energy.

Expansion due to heat: Anomalous expansion of water and its importance in nature; expansion of gases; Charles' Law.

Temperature and thermometers: Construction and graduation of Centigrade and Fahrenheit thermometers; measurement of temperature on absolute scale.

Quantity of heat: Temperature as contrasted with quantity of heat; heat units; specific heat; determination of the specific heat of a solid and of a liquid.

Fusion: Determination of heat of fusion of ice; the influence of salt in solution on the freezing point.

Vaporization: Determination of heat of vaporization of water; dependence of boiling point on pressure and on the presence of salts in solution; evaporation; practical applications of cooling by vaporization; ice machine.

Transference of heat: Conduction and convection, as illustrated in systems of heating by hot water and by steam; ventilation; radiation; radiant energy; effect of temperature and nature of surface; emission and absorption; selective absorption.

The transformation of heat energy into the energy of mechanical motion as exemplified in the steam engine and in the gas engine.

Heat in connection with meteorology: Clouds; rain; winds; dew; frost; dew point; hygrometers, (Regnault's and the wet and dry bulb hygrometer).

Nature of heat: Kinetic theory.

Light.

Propagation: Wave theory of light; rectilinear propagation, image through a pin-hole; photometry, shadow and grease-spot photometers.

Reflection: Laws of reflection; images in plane mirrors; images in spherical mirrors, drawing image of object in any position.

Refraction: Laws of refraction; index of refraction, its measurement, and its relation to the velocities of light in media; total reflection.

Lenses: Converging and diverging; determination of focal length; conjugate foci; drawing of images produced by lenses; vision through a lens, relation of the size of the image to the size of the object.

Optical instruments: Simple microscope; camera; projection lantern.

Colour: Decomposition and recombination of white light; spectrum: complementary colours; rainbow.

Magnetism and Electricity.

Magnetism: Laws of magnetic attraction and repulsion; magnetic field, magnetic lines of force; magnetism by induction; magnetization; molecular theory of magnetization; magnetic permeability, terrestrial magnetism; mariner's compass, inclination and declination of the magnetic needle.

Electricity at rest: Two kinds of electrification; conductors and non-conductors; gold leaf electroscope; induced electrification; electricity at points and at surfaces; lightning rods; the Leyden jar; simple notions of electrical potential.

Electric current: Production of electric current by voltaic cells; electromotive force of a voltaic cell; detection of the electric current; polarization and local action; simple notions of the relation of electro-motive force, current strength, and resistance, names of units, Leclanché cell, dry cell, Daniell cell.

Effects of the electric current: Electrolysis, theory of electrolysis, electro-plating, electrotyping, storage cell, laws of electrolysis, measurement of current strength by electrolysis; magnetic effects, electromagnet, relation between the direction of the current and the polarity of an electromagnet, the electric

telegraph, the electric bell, the galvanometer, the D. C. motor; heating effects of the current, practical applications, electric stoves, electric irons, electric heaters, electric welding; incandescent and arc lamps.

Induced currents: Production of induced currents; laws of induced currents; Lenz's Law; the transformer; the induction coil; the telephone; a simple type of the A. C. and of the D. C. Dynamo.

Reasons for the use of the A. C.; differences in the uses of the A. C. and the D. C.; distribution of electricity as illustrated by the Hydro-Electric System.

Electric measurements: Units of current strength, resistance, and electro-motive force; Ohm's Law; measurement of current strength, the ammeter; measurement of electromotive force, the voltmeter; measurement of resistance, the Wheatstone Bridge.

Special forms of radiation: Electric waves, wireless telegraphy.

Laboratory Equipment for Teaching Middle School Physics

Each group of three or four pupils should be provided with a set of apparatus consisting of the following:—

Sound

- 2 Tuning Forks, C, mounted on Resonance Boxes.
- 1 Tuning Fork, adjustable, unmounted.
- 1 Tuning Fork, A, unmounted.
- 1 Sonometer.
- 1 Whistle, of glass, with sliding piston and mouthpiece.
- 1 Organ Pipe, one side of glass, with membrane on sliding frame.
- 1 Resonance Jar.
- 1 Violin Bow.
- 2 Brass Plates, one square and one circular.
- 1 Clamp for Vibrating Plates.

Heat

- 1 Air Thermometer Bulb.
- 1 Dew Point Apparatus.
- 1 Ball and Ring.
- 1 Compound Bar.
- 1 Calorimeter.
- 2 Chemical Thermometers, graduated in Centigrade and Fahrenheit degrees.
- 1 Tyndall's Specific Heat Apparatus.
- 1 Pound Copper Shot.
- 1 Pound Lead Shot.
- 1 Pound Steel Shot.
- 1 Leslie's Differential Thermometer.
- 1 Leslie's Cube.
- 1 Conductometer.

Light

- 1 Metre Stick and Supports.
- 2 Lens Supports.
- 1 Screen Support.
- 1 Pin Support.
- 2 Mirror Supports.
- 1 Single Candle Holder.
- 1 Quadruple Candle Holder.
- 1 Screen.
- 1 Bunsen Screen.
- 1 Doz. Paraffine Candles.
- 1 Pin Hole Camera.
- 1 Demonstration Set of Lenses.
- 1 Spherical Concave Mirror, 4 cm. in diameter, 25 cm. focal length.
- 1 Spherical Convex Mirror, 4 cm. in diameter, 25 cm. focal length.
- 2 Plane Glass Mirrors, 10 cm x 15 cm.
- 1 Equilateral Prism.
- 1 Right-angled Prism.
- 1 Index of Refraction Plate.

Electricity and Magnetism

- 1 Natural Magnet.
- 2 Bar Magnets.
- 1 Horseshoe Magnet.
- 1 Magnet Board, hardwood, with groove for magnet.
- 1 Shaker for Iron Filings.
- 1 Pound of Fine Iron Filings.
- 1 Compass.
- 1 Bar Soft Iron, round, 6 inches long.
- 1 Doz. Knitting Needles.
- 1 Package Iron Tacks.
Watch Springs for magnetizing.
- 1 Student's Demonstration Battery complete with set of eight elements in electromotive series.
- 1 Galvanoscope.
- 6 Dry Cells.
- 1 Spool Double Covered Magnet Wire, No. 20, to be used for making Electro Magnets, etc.
- 4 Small Incandescent Lamps, (3 Volts.)
- 1 Dipping Needle.
- 1 St. Louis Motor, or other dissectible type.
- 1 Set Telegraph Instruments.
- 1 Electric Bell.
- 1 Simple form of Electrolysis Apparatus.
- 1 Gravity Cell.
- 1 Leclanché Cell.
- 1 Daniell's Cell.
- 1 Glass Friction Rod.
- 1 Vulcanite Friction Rod.
- 1 Flannel Exciting Pad.
- 1 Silk Exciting Pad.
- 1 Cat Skin.

- 1 Doz. Pith Balls.
- 2 Insulating Stands, or suspending Pith Balls.
- 1 Spool Silk Thread.
- 1 Electrophorus.
- 1 Electroscope, flask form.
- 1 Pair Condenser Plates.
- 1 Proof Plane.

General Physics Apparatus

In addition to the apparatus specified above, the Physics Laboratory should be supplied with the following pieces of apparatus for class demonstration:—

Sound

- 1 Set of Sympathetic Tuning Forks.
- 1 Vibrograph.
- 1 Bell in Vacuo.
- 1 Wave Apparatus.
- 1 Kundt's Apparatus.
- 1 Manometric Flame Apparatus.
- 1 Savart's Wheel.
- 1 Set of Acoustic Tubes, Quincke's.
- 1 Interference of Sound Apparatus.
- 1 Siren.

Heat

- 1 Pair of Parabolic Reflectors.
- 1 Radiometer.
- 1 Pyrometer.
- 1 Convection Apparatus, for air.
- 1 Convection Apparatus, for liquids.
- 1 Wet and Dry Bulb Hygrometer.
- 1 Distillation Apparatus.
- 1 Leslie's Differential Thermometer.
- 1 Model Steam Engine.
- 1 Model Gas Engine.
- 1 Hope's Apparatus for finding the Relative Conducting Powers of Metals.

Light

- 1 Optical Disc, with all attachments.
- 1 Bunsen Photometer, complete with screen, mirrors, scale and hoods.
- 1 Newton's Colour Disc and Rotator.
- 1 Mechanical Model of Eye.
- 1 Projection Lantern for projecting both lantern and microscope slides.
- 1 Focussing Lens, large, mounted on stand.
- 1 Hollow Prism, for Carbon Bisulphide.
- 1 Large Glass Refraction Tank.
- 1 Direct Vision Spectroscope.

Electricity and Magnetism

- 1 Wheatstone Bridge.
- 1 D'Arsonval Galvanometer.
- 1 Astatic Galvanometer.
- 1 Tangent Galvanometer.
- 1 Ammeter.
- 1 Voltmeter.
- 1 Water Voltameter.
- 1 Copper Voltameter.
- 1 Large Induction Coil.
- 1 Set of Telephone Instruments.
- 1 Set of Wireless Telegraph Instruments.
- 1 Radio Set.
- 1 Arc Lamp with simple Regulator.
- 1 Set of Coils for demonstrating the Laws of Current induction.
- 1 Storage Battery.
- 1 Dissectible Dynamo.
- 1 Current Rectifier.
- 1 Model Transformer.
- 1 Resistance Box.
- 1 Lamp Rheostat Board.
- 1 Static Machine, Wimhurst.
- 1 Electric Plume.
- 1 Electric Chime.
- 1 Electric Whirl.
- 1 Faraday's Bag.
- 1 Set Biot's Hemispheres.
- 1 Pair of Induction Spheres.
- 1 Set of Geissler's Tubes.
- 1 X-Ray Tube.
- 1 Fluoroscope with screen.
- 1 Crookes' Tube.
- 2 Leyden Jars.
- 1 Jointed Discharger.

CHEMISTRY.

An experimental study of the following elements and their more important compounds: hydrogen, oxygen, sulphur, sodium, potassium, nitrogen, chlorine, bromine, iodine, carbon, calcium.

The course of work should be arranged so as to give the pupils a knowledge of the following:

Mixtures, solutions, compounds, and elements, and their various properties and reactions.

Acids, bases, and salts.

Fundamental laws and principles, as: conservation of mass, definite proportions, multiple proportions, valency, proportions by volume in which gases react.

The quantitative meaning and use of chemical symbols, formulae and equations.

Chemical nomenclature.

Simple quantitative experiments and problems.

The application of chemistry to the industries, illustrated by an account of the commercial manufacture and use of some of the more important substances included in this course.

AGRICULTURE AND HORTICULTURE.

Regulations.

1. The Regulations for the Lower School apply also to the Middle School. Similar requirements as regards the instruction and examinations shall be met for both the Lower School and the Middle School, as follows:—

- (a) Annual notification of intention to undertake the work shall be sent to the Deputy Minister of Education, Toronto.
- (b) The instruction shall be given by a teacher who holds the degree of B.Sc. (Agr.), a Specialist's certificate, or the Intermediate certificate in Agriculture.
- (c) The course is intended to extend over two years and the provision therefor in the teacher's time-table shall be at least three periods a week of 40 minutes each, or the equivalent thereof.
- (d) In addition to the school work, home projects, supervised by the teacher, shall be carried out by pupils. Systematic records of this work shall be kept by the pupils.
- (e) Teachers shall keep records of the instruction given, and at the end of December shall send in the prescribed reports to the Minister.

The following are the details of the Course of Study:

PART I—(First Year)

AGRICULTURAL PHYSICS.

Soil: Classification and identification of samples of soil by the "beaker" method into clay, loam, clay loam, sandy loam and sand; comparison of two soils by the aid of a compound microscope; identification and study of soil in the fields; experiments to show the physical effects of lime on heavy and on light soil.

Cultivation principles; practice as illustrated by the use of plow, cultivator, scuffler, harrow and roller; experiments to

show the use of mulches, and the action of frost on heavy soil.

Drainage: Methods and value; calculation of cost of tile drainage of a given area.

Surveying: Use of instruments (including level and chain) for taking levels, running lines; calculation of areas.

Farm Mechanics: Care of tools and farm implements; experiments to show warping and splitting of wood on exposure to the weather; practice in sharpening such tools as chisel, knife and scissors; the use of levers and pulleys in machinery; principle of the internal-combustion engine.

Electricity: Electricity at rest:—Two kinds of electrification; conductors and non-conductors; gold leaf electro-scope; induced electrification; electricity on points and surfaces; the Leyden jar; lightning rods.

Current Electricity:—Principle of the voltaic cell; use of dry cells; detection of the current; galvanometer; simple motions of electromotive force, current strength, and resistance, including names of units; electro-magnet; relation between the direction of the current and the polarity of a magnet; telegraph; electric bell; electrical appliances,—irons, stoves, lamps; production and principles of induced currents; the induction coil and transformer; use and care of storage cells.

AGRICULTURAL CHEMISTRY.

General: A brief experimental study of the following elements:—carbon, oxygen, hydrogen, nitrogen, phosphorus, sulphur, potassium, calcium, and the compounds of these elements used by green plants; chemical symbols, formulae and equations; chemical nomenclature.

Note:—It is intended that the student through experimental study shall become familiar with the above mentioned elements and their compounds which have direct bearing upon agriculture.

Soils: Experiments to show how the insoluble compounds of the soil containing calcium and phosphorus may be made soluble (e.g., the action of carbon dioxide and water on calcium carbonates and phosphates); a study of the amount of plant food constituents in soil; the necessity of an abundance of humus and lime (compounds of calcium); nitrification; means of getting nitrogen into the soil; special influence of nitrogen, phosphorus, and potassium compounds on the growth of plants; influence of period of growth, range of root, and ability of plants to assimilate food, on the problem of the manuring for different crops.

Barnyard Manure and Fertilizers: Composition, care and treatment of barnyard manure; commercial sources of nitrogen, phosphorus and potassium used to supplement barnyard manure; experiments to prove the

presence of and to show the relative solubility of the three plant-food elements in these materials and why certain of the materials should not be mixed; calculation of the percentage of available plant-food in different mixtures of fertilizer materials; explanations of the commercial terms "phosphoric acid" and "potash." The chief provisions of the Fertilizer Act.

Insecticides and Fungicides: An experimental study of arsenate of lead, arsenate of lime, Paris Green, lime-sulphur, Bordeaux mixture, and orchard "dusts"; why some insecticides and fungicides cannot be used in combination.

PART II—(Second Year).

Botany: Calculation of the percentages of foul seed in three or four samples of clover (or alfalfa) and timothy; use of compound microscope in examining spores and mycelia; recognition, from specimens, of rusts, smuts, white rust of crucifers, brown rot of stone fruits, mildew of cherry or lilac and anthracmose of bean. Chief provisions of Seed Control Act and Noxious Weeds Act.

Entomology: Identification, nature of injury, life history and methods of control of any six of the most common harmful insects of the district, e.g., white grub, wire worm, plum curculio, codling moth, San Jose scale; oyster shell scale, cabbage maggot, cabbage worm, Hessian fly, European corn borer, potato beetle, and clothes moth.

Poultry: Practical operation of the incubator—ventilation, moisture, candling eggs, variation in size of air chamber, blood clots, development of the embryo by examining eggs broken open every one or two days during the period of incubation; use of water-glass in preserving eggs; poultry products and marketing.

Dairying: Principles and uses of the Babcock machine and the lactometer; testing cream and skim milk (or whey) for fat; determining whether milk has been watered by use of the formula— $(L.R. at 60^\circ \text{ plus } \% \text{ of fat}) \div 4 = \% \text{ S.N.F.}$; food value of milk and its products; principle and use of the milk separator; making butter with a laboratory churn; use of starters.

Field Crops: Different types of farming; crop distribution over Ontario; meaning and importance of crop rotation; influence of the keeping of live stock on the kind of rotation; germination tests of seed, e.g., oats, turnips, corn, clover; laboratory work in seed judging and seed selection; meaning and merits of pasture crops, silage crops and soiling crops; the yield

and quality of crop as influenced by the time of sowing; calculation of the relative value of certain crops as "money" crops.

Animal Husbandry: History and characteristics of the chief breeds of horses, cattle, sheep, swine; value and importance of live stock; a survey of the breeds found in the locality; meaning of pedigree stock and grade stock; disadvantage of keeping scrub stock; visit to a local farm to study the stock kept there.

Horticulture: Orchard management—spraying, pruning, grafting, cultivating; cover crops; packing and marketing apples; methods of producing early vegetables; practice in seeding, transplanting cultivation, mulching; fruit survey for at least two kinds of fruit.

LATIN AND GREEK.

The courses in the Lower School in grammar and composition continued.

The authors prescribed for the Middle School examinations. Sight work.

FRENCH AND GERMAN.

The courses in the Lower School in grammar and composition continued.

The authors prescribed for the Middle School examinations. Sight work.

SPANISH AND ITALIAN.

The courses in the Lower School in grammar and composition continued.

The authors prescribed for the Middle School examinations. Sight work.

ART.

Note:—The following is suggested as a suitable course in Art in the Middle School. It will not be accepted for admission to the Normal Schools or to the Universities, but may be used for the purposes of the Graduation Diploma. When used for these purposes sections I and III are obligatory, and an option

is allowed between section II and section IV. On request of the Principal, an examination paper will be set by the Department.

I. Freehand Drawing:—Review of such parts of the Lower School course as may be found necessary.

Mediums:—Pencil and water colour with such other mediums as the teacher may approve.

Freehand drawing in outline, in neutral values and in colour, of studies selected from the following:

- (1) Still life groups.
- (2) Characteristic Canadian trees in their immediate natural setting, maple, elm, oak.
- (3) Foliage and fruit of such trees as the pine, cedar, larch, maple and oak.
- (4) Smaller domestic animals such as the cat, dog or rabbit; or examples from the school museum such as the squirrel, mink or raccoon.
- (5) Articles of furniture such as chairs, tables and buffets.
- (6) Articles of apparel such as coats, hats and boots.
- (7) Room interiors.
- (8) Building exteriors.
- (9) Casts of ornament.

Careful attention shall be given:

- (1) To the expression of light and shade, texture, and character.
- (2) To grouping.
 - (a) From study of scattered objects to draw a well-composed group.
 - (b) To draw from memory a group of common objects to illustrate a subject such as "gardening," "preserving," "music."
- (3) Memory drawing.
- (4) Figure drawing should be encouraged wherever special ability is shown.

II. Design.

Review of such parts of the Lower School course as may be found necessary.

Mediums:

Pencil, water colour, lettering pen and waterproof India ink.

(Tempera colours may be substituted for ordinary water colours where considered more suitable.)

A. Principles of Design.

Practice in the principles of design may be given in a selection from the following:—

- (1) Designs for embroidery, beading and braiding for dress and dress accessories.
- (2) Designs for the doilies, runners, cushions and curtains and other home-furnishings.

- (3) Designs for ornamental ironwork, as for fences, gates, brackets, hinges, registers, ornamentation on wood as on trays, book-ends, tea-pot stands.
- (4) Designs for the decoration of the printed page:—
 - (a) Variations of the classic Roman alphabet.
 - (b) Book-plates.
 - (c) Trade-marks and calligrams.
 - (d) Posters and window show-cards.
 - (e) Simple illumination.
 - (f) Head-pieces and tail pieces.

Teachers may substitute (4) above for (1), (2), and (3) above.

- (5) Designs developed from a study of historic Greek ornament.

Colour sense may be developed:

- (1) In the perception of colour in natural forms such as the leaf, fungus, shell, rock, feather, butterfly.
- (2) In the creation of colour schemes for home and school decoration.
- (3) In the application of these colour schemes to design.

B. Practical Application of Design.

The following are recommended:—

- (1) The cutting of stencils for the transfer of patterns to objects of use and adornment.
- (2) The modelling of simple forms in clay or plasticine.
- (3) The designing, and moulding in coloured cement of simple tile patterns.

III. Appreciation.

A comparative study of masterpieces of painting, of sculpture, of the outstanding characteristics of the principal styles of architecture, and of the leading periods of furniture.

IV. Applied Mechanical Drawing.

- (1) Care and use of mechanical instruments:—the dividers, the compass, the ruling pen, the bow-pen, the scale, the T-square, the set square (30° and 45°), the French curve.
- (2) (a) The conventional lines used in making and dimensioning working drawings.
 (b) The conventional lining of sections of the various kinds of material.
- (3) The practice of a style of freehand lettering founded upon the single stroke Gothic, inclined and vertical.
- (4) The working of basic problems such as:—
 1. To bisect a straight line.
 2. To erect a perpendicular to a given line at a given point in the line.
 3. To draw a perpendicular to a given line from a point outside the line.
 4. To erect a perpendicular to a given line from a

point at its end.

5. To draw a line parallel to a given line at a given distance from it.
 6. To construct an equilateral triangle on a given base.
 7. To construct a square on a given base.
 8. To inscribe a square within a given circle.
 9. To bisect a given angle.
 10. To trisect a right angle.
 11. To construct at a given point in a given line an angle equal to a given angle.
 12. To divide a given line into any number of equal parts.
 13. To inscribe a regular hexagon within a given circle.
 14. To construct a regular hexagon upon a given line.
 15. To construct a regular octagon within a given square.
 16. To draw a tangent at any point in a given circumference.
 17. To inscribe a circle within a given triangle.
 18. To construct an equilateral triangle when the altitude is given.
 19. To circumscribe a square about a given circle.
 20. Within a given circle to draw any number of equal circles tangent to each other and to the given circle.
 21. To draw an ellipse whose axes are given.
 22. To draw an egg-shaped oval.
 23. To draw a spiral.
- (5) Orthographic projection of type solids and of a few common objects.
1. To draw top view, front view, and, when required, side view of a cube, a pyramid, a cylinder, a cone, and a hexagonal prism.
 2. To make a working drawing and surface pattern,
 - (a) of a funnel.
 - (b) of a two part right-angled elbow.
 - (c) of a lamp shade.
- (6) The designing and drawing of patterns with a geometric treatment:
- (a) in a square and rectangle and circle.
 - (b) of repeating surface patterns.
 - (c) of borders (fret, Guilloche, wave).
 - (d) of tracery of Gothic windows.
- (7) The drawing of cross sections and of elevations of simple standard mouldings.
- (8) Working drawings:
1. Of metal such as screw threads, bolt heads and

nuts; easy machine parts; tools, such as wrench and plane.

2. Of wood, such as mallet, clamp, book-stall, table, cabinet.

(9) Architectural drawings:

Plans and elevations of a cottage or a bungalow, with details of doors and windows.

(10) Historic and modern forms of the arch.

MUSIC.

The Lower School Course continued and extended.

BOOKKEEPING AND PENMANSHIP.

The Lower School Course continued and extended.

STENOGRAPHY AND TYPEWRITING.

The Lower School Course continued and extended.

MANUAL TRAINING.

The Lower School Course continued and extended.

HOUSEHOLD SCIENCE.

The Lower School Course continued and extended.

UPPER SCHOOL SUBJECTS.

ENGLISH COMPOSITION.

The Middle School Course continued and extended.

The principles of composition systematically studied.

Note:—Good composition in all written work should be demanded by every teacher.

ENGLISH LITERATURE.

Intelligent and appreciative study of suitable authors, both prose and poetry, including those prescribed for the Departmental and University examinations.

Systematic oral reading by pupils of the texts studied in class.

Supplementary reading provided by the pupils themselves or supplied from the school and the public library.

Memorization and recitation of choice selections in prose and poetry prescribed by the Department and of others made by the teacher.

Note:—At this stage, the pupil should be able to read literature still more appreciatively; but the chief object continues to be the cultivation of a taste for good literature, and critical study should be subordinated thereto.

MODERN WORLD HISTORY—1789-1920.

Note:—The course in Modern World History includes the geography of the history prescribed.

1. Problems of the period; a general statement: (a) political, (b) social and economic, (c) educational, (d) religious.
2. The French Revolution, 1789-1799, and its influence on other peoples.
3. The Napoleonic Era, 1799-1815, and its world results.
4. The period of reaction after 1815.
5. The Industrial Revolution.
6. The growth of Democracy to 1848, especially in England and the United States.
7. The development of Nationalism after 1848:—France, Italy, Germany, Russia, the Balkan States.

8. National Imperialism:—British Empire, German Empire, Russian Empire, China, Japan, the United States.
9. International Relations:—Alliances of European Powers, the Munroe Doctrine.
10. The Great War:—Causes, great campaigns, results.
11. Survey of contemporary civilization:—political, social and economic, educational (including literature and art), scientific, religious. Only outstanding features to be included.
12. Civics: Development of the Canadian Constitution, 1763-1920, as outlined in the High School History of Canada.

BOOKS OF REFERENCE.

The following books will be found useful for supplementary reading on the topics of the course and should be placed in every High School library:—

Robinson and Beard, A History of Europe; Our Own Times. Ginn & Co.

Hazen, Modern European History. Holt.

Hayes, Political and Social History of Modern Europe, 2 vols. Macmillan.

Robinson and Beard, Readings in Modern European History, 2 vols. Ginn & Co.

Matthews, The French Revolution. Longmans.

Belloc, The French Revolution. Ryerson Press.

Fisher, Napoleon. Ryerson Press.

Seymour, Diplomatic Background of the War. Yale University Press.

Robertson and Bartholomew, Atlas of Modern European History. Oxford University Press.

Hearnshaw, Historical Atlas of Modern Europe. Macmillan.

ALGEBRA.

The course of the Middle School reviewed and extended.

Theory of divisors.

Ratio, proportion, and variation.

Progressions.

Scales of notation.

Permutations and combinations.

Binomial theorem.

Interest forms, annuities, and sinking funds.

GEOMETRY.

Note:—Part C is required of all candidates; an option is allowed between Part A and Part B.

Part A. Synthetic Geometry.

Exercises on the course prescribed for the Middle School, with special reference to the following topics:—loci; maxima and minima; the system of inscribed, escribed and circumscribed circles of a triangle with metrical relations; radical axis.

The following propositions in Synthetic Geometry, with exercises thereon:—

To divide a given straight line internally and externally in medial section.

To describe a square that shall be equal to a given rectilineal figure.

To describe an isosceles triangle having each of the angles at the base double of the third angle.

To inscribe a regular pentagon in a given circle.

The squares on two sides of a triangle are together equal to twice the square on half the third side and twice the square on the median to that side.

If $A B C$ be a triangle, and A be joined to a point P of the base such that $BP : PC = m : n$, then $n A B^2 + m A C^2 = (m+n) A P^2 + n BP^2 + m PC^2$.

In a right-angled triangle the rectilineal figure described on the hypotenuse is equal to the sum of the similar and similarly described figures on the two other sides.

If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base, together with the square on the straight line which bisects the angle.

If from the vertical angle of a triangle a straight line be drawn perpendicular to the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circle described about the triangle.

The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

Two similar polygons may be so placed that the lines joining corresponding points are concurrent.

If a straight line meet the sides $B C$, CA , $A B$, of a triangle $A B C$ in D , E , F , respectively, then $B D \cdot C E \cdot A F = D C \cdot E A \cdot F B$, and conversely. (Menelaus' Theorem.)

If straight lines through the angular points A , B , C of a triangle are concurrent, and intersect the opposite sides in D , E , F respectively, then $B D \cdot C E \cdot A F = D C \cdot E A \cdot F B$, and conversely. (Ceva's Theorem.)

If a point A lie on the polar of a point B with respect to a circle, then B lies on polar of A .

Any straight line which passes through a fixed point is cut harmonically by the point, any circle, and the polar of the point with respect to the circle.

In a complete quadrilateral each diagonal is divided harmonically by the other two diagonals, and the angular points through which it passes.

Part B. Solid Geometry.

Definitions:—General description of figures in three dimensions. The following propositions, with exercises thereon:—

1. A plane is determined by (a) a straight line and point not on it, (b) two intersecting straight lines, (c) two parallel straight lines.
2. Two intersecting planes cut one another in a straight line and in no other point.
3. If two straight lines are parallel, any plane intersecting one of them intersects the other.
4. If two planes are parallel, any straight line intersecting one of them intersects the other.
5. If a straight line is perpendicular to two intersecting straight lines at their point of intersection, it is perpendicular to every straight line in their plane through their point of intersection.
6. Conversely, all straight lines intersecting a given straight line at a given point and perpendicular to it lie in a plane.
7. If one of two parallel straight lines is perpendicular to a plane, the other is also.
8. Conversely, if two straight lines are perpendicular to the same plane, they are parallel.
9. If a straight line be at right angles to a plane, any plane through the line is perpendicular to the plane.
10. To draw a perpendicular to a given plane from a given point.
11. One and only one straight line can be drawn through a given point and perpendicular to a given plane.
12. The perpendicular from a given point to a plane is the shortest distance from the point to the plane.
13. If two straight lines are parallel to the same straight line they are parallel to each other.
14. If two intersecting straight lines are parallel respectively to two other intersecting straight lines the contained angles are equal.
15. If two planes have a common perpendicular they are parallel, and conversely.
16. If two intersecting straight lines are respectively parallel to two other intersecting straight lines, the plane of the first two is parallel to the plane of the second two.
17. Straight lines which are cut by three or more parallel planes are cut proportionally.

18. To draw a perpendicular to two given straight lines not in the same plane.
19. There is only one common perpendicular to two straight lines not in the same plane.
20. In a tetrahedron the sum of any two angles at a vertex is greater than the third; and the sum of the three angles is less than four right angles.
21. In a polyhedron the sum of the number of faces and the number of corners or vertices is two greater than the number of edges.
22. There are not more than five regular polyhedra.
23. The four diagonals of a parallelopiped are concurrent and bisect one another.
24. The four straight lines which join vertices of a tetrahedron to the centroids of the opposite faces meet in a point which divides them in the ratio of 3:1; and the three straight lines which join the middle points of opposite edges meet in the same point and are bisected there.
25. Any plane section of a pyramid taken parallel to the base, is similar to the base, and the area of such a section varies as the square of its distance from the vertex.
26. The volumes of two pyramids of equal heights and equal base areas are equal.
27. One sphere and only one can pass through four points not in the same plane.

Mensuration of volumes, surface areas, linear measurements in the following:—prism; pyramid; cylinder; cone; frustum of cone, pyramid or sphere; zone of sphere.

PART C.—ANALYTICAL GEOMETRY

Axes of co-ordinates. Position of a point in plane of reference.

Transformation of co-ordinates,—origin changed, or axes (rectangular) turned through a given angle.

$$\pm 2A = x_1(y_2 - y_3) + \dots + \dots$$

Co-ordinates of point dividing line joining $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$, in ratio $m:n$ are

$$x = \frac{mx_2 + nx_1}{m+n}, \quad y = \frac{my_2 + ny_1}{m+n}$$

$$(P_1P_2)^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2$$

Equations of straight lines.

$\frac{x-x_1}{x_1-x_2} = \frac{y-y_1}{y_1-y_2}$ $\frac{x}{a} + \frac{y}{b} = 1.$	}	Line defined by two points through which it passes.
$\frac{x-a}{\cos \theta} = \frac{y-b}{\sin \theta} = r.$ $y = mx + b.$ $y = m(x-a).$ $x \cos a + y \sin a = p.$		Line defined by one point through which it passes and by its direction.

General equation of 1st degree, $Ax + By + C = 0$, represents a straight line.

Any line through (x_1, y_1) is

$$A(x - x_1) + B(y - y_1) = 0.$$

If θ be angle between $Ax + By + C = 0$ and $A'x + B'y + C' = 0$, then

$$\tan \theta = \frac{A'B - AB'}{AA' + BB'}$$

Condition of \perp arity, $\frac{A}{A'} \cdot \frac{B}{B'} = -1$.

Condition of \parallel ism, $\frac{A}{A'} = \frac{B}{B'} = k$.

Distance from (a, b) to $Ax + By + C = 0$, in direction whose direction cosines are (l, m) , is

$$-\frac{Aa + Bb + C}{\sqrt{Al^2 + Bm^2}}.$$

r distance from (a, b) on $Ax + By + C = 0$,

$$\frac{Aa + Bb + C}{\sqrt{A^2 + B^2}}$$

$$\pm \frac{\sqrt{A^2 + B^2}}{\sqrt{A^2 + B^2}}.$$

THE CIRCLE—

Equations in forms;

$$\begin{aligned}x^2 + y^2 &= r^2. \\(x - a)^2 + (y - b)^2 &= r^2. \\y^2 &= 2rx - x^2.\end{aligned}$$

General equation: $x^2 + y^2 + 2Ax + 2By + C = 0$

$$\text{or } (x + A)^2 + (y + B)^2 = A^2 + B^2 - C$$

represents a circle with centre $(-A, -B)$ and radius $\sqrt{A^2 + B^2 - C}$.

Tangent at (x', y') to $x^2 + y^2 = r^2$ is $xx' + yy' = r^2$.

$$\text{Normal is } \frac{x}{x'} = \frac{y}{y'}.$$

Tangent in form $y = mx \pm r\sqrt{1+m^2}$.

Pole being (x', y') , polar is $xx' + yy' = r^2$.

If pole move along a line, polar turns about pole of that line.

Square of tangent from (x', y') to $x^2 + y^2 + 2Ax + 2By + C = 0$.
is $x'^2 + y'^2 + 2Ax' + 2By' + C$

Radical axis of $x^2 + y^2 + 2Ax + 2By + C = 0$,
 $x^2 + y^2 + 2A'x + 2B'y + C' = 0$.

Easy exercises on the preceding propositions.

TRIGONOMETRY.

The Trigonometrical ratios with their relations to one another; sines, etc. of the sum and difference of angles, with deduced formulae.

Use of logarithms.

Solution of triangles.

Expression for the area of triangles.

Inverse functions.

Radii of circumscribed, inscribed, and escribed circles.

PHYSICS

A course defined as follows, the topics to be presented experimentally with mathematical applications simple and direct in character:

Mechanics of Solids.

Metric and English units of length. Use of vernier calipers, screw-gauge, in measurement of wires, cylinders, spheres, plates, etc.; unit of time.

Motion; velocity, uniform and variable; average velocity; velocity at a point.

Newton's first law of motion, force, inertia, and mass; metric and English units of mass.

Acceleration measurement of uniform acceleration, acceleration due to gravity, value of g .

Momentum; Newton's second law; measurement of force; metric and English absolute and gravitational units of force.

Newton's third law; Conservation of momentum; centripetal and centrifugal force with illustrations, centrifuge, cream separator, form of earth, etc.

Composition and resolution of forces; parallelogram of forces; triangle of forces; moments, couples; centre of gravity.

Friction: Laws of friction; co-efficient of friction.

Gravitation: Newton's laws of gravitation; Cavendish's experiment.

Work: Measurement of work in metric and English absolute and gravitational units; energy; measurement of energy; kinetic and potential energy; conservation of energy.

Power: Measurement of power; horse power; the watt.

Machines: Mechanical advantage; lever; wheel and axle; pulley; inclined plane; screw; wedge; simple combinations of the foregoing.

Mechanics of Fluids.

Pressure: Pressure at a point; Pascal's law; pressure due of gravity; equilibrium of fluids at rest; Archimedes' principle; buoyancy; hydraulic pressure; specific gravity; determination of specific gravity of solids and liquids.

Atmospheric pressure: Barometers; weight of air; pressure due to molecular motion; lift and force pumps; siphon; the use of compressed air, airbrakes, air tools.

Velocity due to pressure: Torricelli's theorem; pressure in a moving column of fluid varies with the velocity; application to explain the principle of the atomizer, the Bunsen burner, the Bunsen filter pump, forced draught, the curved flight of a ball.

Surface tension; surface force; surface energy; capillarity; practical applications.

Transformations of Energy

Mechanical equivalent of heat, measured mechanically and electrically; measurement of electrical energy; the kilowatt hour.

Laboratory Equipment for Teaching Upper School Physics

Mechanics and Properties of Matter

Apparatus for determination of average velocity and acceleration.

Apparatus to show relation of force to acceleration.

Guinea and Feather Tube.

Apparatus to determine acceleration due to gravity.

Apparatus for demonstrating parallelogram, triangle and polygon of forces.

Apparatus for investigating parallel forces.

Apparatus for demonstrating laws of friction.

Air Pump and Receiver.

Elastic Rubber Balloon. A toy balloon answers well.

Transmission of Pressure Apparatus.

Apparatus for demonstrating equilibrium of fluids under action of gravity.

Apparatus for determination of whole pressure.

Archimedes' Principle.

Globe for weighing air.

Barometer Tube, heavy glass.

Standard Barometer.

Mariotte's Law Tube.

Lift Pump, Glass Model.

Force Pump, Glass Model.

Hydraulic Press, Glass Model.

Surface Tension and Flow of Fluids

Capillary tubes, set of.

Small and large tube connected.

Glass cell and "pill-box" pulley.
 Surface tension wires.
 Separating funnel.
 Two-compartment cell, for projection.
 Apparatus for vertical jet (Torricelli's)
 Tube of varying size with pressure tubes.
 Atomizer.
 Jet Pump, glass model.
 Bunsen jet pump.
 Hollow glass bulbs, set of 4.

CHEMISTRY.

Chemistry of the Middle School reviewed and continued.

Reversible reaction and chemical equilibrium: e.g., ice \rightleftharpoons water, water \rightleftharpoons steam; bluestone \rightleftharpoons anhydrous copper sulphate and water; limestone \rightleftharpoons quicklime and carbon dioxide; ferric chloride and ammonium sulphocyanate \rightleftharpoons ferric sulphocyanate and ammonium chloride (in solution); a salt in equilibrium with saturated solution, etc.

Conditions which affect equilibrium.

Rate of reaction and conditions that affect it (including catalysis): e.g., the action of a dilute on solution of potassium permanganate, oxalic acid, in presence of sulphuric acid, the souring of milk, etc.

A study of the following elements and their most characteristic compounds, having regard to Mendelejeff's classification and to their most important economic and industrial applications: Hydrogen, sodium, potassium, magnesium, zinc, calcium, aluminium, carbon, lead, nitrogen, phosphorus, arsenic, antimony, oxygen, sulphur, chlorine, bromine, iodine, iron, copper, silver.

Qualitative analysis (practical) may be used for studying the properties of the above elements and for further illustrations of reversible reactions and chemical equilibrium: e.g., a very dilute solution of lead nitrate does not give a precipitate of lead chloride, and the same solution may give a precipitate of lead sulphide and from this we may draw conclusions as to the relative solubility of these lead compounds; a dilute solution of lead nitrate with sulphuric acid gives a precipitate of lead sulphate soluble in nitric acid, etc.

It should be kept in mind that the student is not learning analysis but is using the scheme for qualitative analysis to provide illustrations of chemical equilibrium and to illustrate the properties of the compounds, e.g., insolubility, etc.

Organic Chemistry:

Alcohols, acids and esters (fats); methyl alcohol, ethyl alcohol, glycerine, acetic acid, stearic acid, ethyl acetate, tallow and lard.

Soap making.

Carbohydrates: glucose, cane sugar, starch, cellulose. Hydrolysis of starch.

Proteins. Petroleum and its commercial products. Fractional distillation.

These organic compounds should be treated from the descriptive point of view and few formulas should be used.

Note:—It is suggested that the topics under "Organic Chemistry" be not treated more exhaustively than they are in such text-books as:—

Alexander Smith's Intermediate Chemistry.

Macpherson and Henderson's First Course in Chemistry.

BIOLOGY

BOTANY.

Experimental Physiology:

Practical studies of absorption (osmosis), plasmolysis, transpiration, photosynthesis, respiration, irritability (e.g., heliotropism), and rate of growth.

Morphology and Physiology:

Structure and general functions of the following plant organs: leaf, root, stem, flower, seed, fruit; Modification of roots, stems, and leaves for the special functions of storage and support. Light relations of leaves. Stipules, spines and bud-scales. Underground stems, comparison of roots and stems. Pollination and adaptations for cross-pollination. Fertilization, seed dispersal, vegetation reproduction as contrasted with sexual reproduction. Study of typical seeds. Classification of fruits. A study by means of sections of the cellular structure of the leaf and of the relative arrangement of the more important tissues and tissue systems of the stem and root of bean and maize, or of any other typical dicotyledon and monocotyledon.

Cryptogams:

The practical study of representatives of the chief subdivisions of the cryptogams: spirogyra, a mushroom, a lichen, a liverwort, a moss, a horsetail, a clubmoss, and a fern. Distribution and economic importance of yeasts and bacteria. Microscopic structure of the yeast plant. Microscopic observation of a bacterial colony.

Recognition, economic importance and control of the following parasitic fungi: grain rust, loose smut of oats or corn smut, apple scab and black knot.

Phanerogams:

The practical study of representatives of the seed plants of the locality, including at least one member of each of the following orders:—Coniferae, Gramineae, Liliaceae, Ranunculaceae, Cruciferae, Rosaceae, Leguminosae, Sapindaceae, Umbelliferae, Labiate, Scrophulariaceae, Compositae.

Ecology:

Relation of the structure of plants to their environment.

Plant associations:—mesophytes, hydrophytes, xerophytes.

Characteristics of these classes.

Classification:

The placing of the types studied in their natural divisions, characteristics of these divisions.

Comparison of the ecological with the structural classification.

ZOOLOGY.

Practical study of the external form of all types, and the dissection or the study of prepared specimens (or models), as specified below. Observational drawings are essential.

Mode of life and life history of the various types. Reasons for including these types in their respective groups.

Arthropoda:

Practical study of the external features of the crayfish, including segmentation and appendages, mode of locomotion and respiration.

Description, life-history and relation to man of the following insects:—May beetle, European corn borer, codling moth, tent caterpillar, mosquito, honey bee, ichneumon fly. Comparison of the external features of the crayfish, grasshopper (or cricket), millipede and spider.

Study of the principles of classification as illustrated by the Arthropoda.

Recognition-characters of the following orders of insects: Orthoptera, Coleoptera, Odonata, Diptera, Lepidoptera, Hemiptera, and Hymenoptera.

Vermes:

Practical study of the external features of the earthworm. Dissection of the earthworm. Study of cross-section of the earthworm for arrangement of chief organ systems only. Mode of locomotion and respiration.

Mollusca:

Practical study of the external features and mode of locomotion and respiration, of the fresh-water clam; comparison in these respects with the snail.

Protozoa:

A practical study of the living amoeba or paramoecium.

Chordata:**Pisces:**

Practical study of the external features; chief visceral organs; circulation and respiration of some common fish.

Amphibia:

Practical study of the frog under the following headings:—

- (a) external features, (b) the skeleton, (c) the organs of respiration, circulation, digestion and excretion,

. (d) the central nervous system, (e) the attachment and action of a muscle of the hind leg.

Study of a cross-section of the frog for arrangement of organ systems.

Observation of the external features of the development of a frog or toad.

Comparison of a frog with a fish as to organs of locomotion, circulation, and respiration.

Reptilia:

Practical study of the external features of a snake and a turtle.

Aves:

Practical study of the external features, plumage and skeleton of some common bird. Adaptations to flight with special reference to the form, skeleton, and organs of respiration.

Chief types of bills and feet.

Mammalia:

Practical study of (a) chief features of the skeleton, (b) organs of respiration, circulation, digestion and excretion, of a rabbit or a cat.

Comparison of the brain of a rabbit (or cat) with that of a bird, and that of a frog.

Study of mammalian eye from a specimen or from a model.

Note:—Except in the case of the frog and of the earthworm where dissection is required, prepared specimens or models may be used. The cross-sections of the frog and of the earthworm should be studied with the low power microscope.

LATIN AND GREEK.

The courses of the Middle School in grammar and composition continued.

The authors prescribed for the Upper School examinations.

Sight work.

FRENCH AND GERMAN.

The courses of the Middle School in grammar and composition continued.

The authors prescribed for the Upper School examinations.

Sight work.

SPANISH AND ITALIAN.

The courses of the Middle School in grammar and composition continued.

The authors prescribed for the Upper School examinations.

Sight work.

LOWER, MIDDLE AND UPPER SCHOOL EXAMINATIONS.

Notes. (1) The machinery for the conduct of the Lower, Middle and Upper School examinations is provided by the Department of Education.

(2) The Universities and Learned Societies select the papers—University or Departmental—that will meet the requirements of their preliminary examinations.

(3) On request, addressed to the Deputy Minister, the results of the Departmental examinations in which they are concerned are communicated by the Department to the Universities and the Learned Societies.

Examiners-in-Chief and Associate Examiners.

1. (1) The examiners-in-chief to set the question papers for the Lower, Middle and Upper School examinations, and the Associate Examiners to value the answer papers of the candidates will be appointed by the Minister of Education.

(2) The Associate Examiners to value the answer papers of candidates for the Lower School examination for admission to the Normal Schools shall be holders of Permanent High School certificates or of Permanent First Class certificates who have had at least two years' experience in High or Continuation School work, and are actually engaged in teaching in the Normal, High, or Continuation Schools.

(3) The Associate Examiners to value the answer papers of candidates at the Middle and Upper School examinations shall be graduates of a British University or Specialists according to the Regulations of the Department of Education, who hold Permanent High School certificates, and are actually engaged in teaching in the Normal, High, or Continuation Schools.

(4) No Associate Examiner will be appointed to value the answer papers in a subject which he is not actually engaged in teaching.

(5) The valuation of the answer papers will be conducted at the Department under instructions from the Minister.

EXAMINATION CENTRES AND DATES.

JUNE EXAMINATIONS.

2. (1) Subject to the conditions hereinafter contained and in accordance with a time-table to be issued by the Minister from time to time, written examinations, as defined below, will be held by the Department of Education, as follows:

In June, the Lower, Middle, and Upper School examinations, at each High School and Collegiate Institute, and at such other centres as the Minister may approve on the recommendation of the Public School Inspector.

(2) The examinations at each local centre shall be conducted, and the cost thereof paid, under instructions from the Minister.

SEPTEMBER EXAMINATIONS.

3. (1) Uniform Supplementary examinations on the subjects of the Middle and Upper School courses will be held in September in accordance

with a time-table which will be issued by the Minister.

(2) Those candidates may be admitted to the Middle and Upper School examinations in September who were eligible for admission to the corresponding examinations in June, and those who were in attendance at the Summer Schools.

(3) These September uniform examinations will be held as follows:

(a) At the University of Toronto; Queen's University, Kingston; McMaster University, Toronto; Western University, London.

(b) At any other centre within the Province, provided the candidate or candidates apply before September 1st, and undertake to pay the additional fees for presiding which are specified in 4(2)(c) below.

(c) At any centre elsewhere in Canada, provided the candidate or candidates apply before August 25th, and undertake to pay all the local expenses, including the Presiding Officers' allowances, express charges, and cost of supplies.

(4) For the September examinations, the Department of Education will pay the Presiding Officers' allowances at a rate to be determined by the Minister, the express charges, and the cost of supplies at the centres established under (3) (a) and (b) above.

(5) The Presiding Officer shall collect from the candidates the full amount of any other local expenses that he may find it necessary to incur.

EXAMINATION FEES.

4. The following are the fees for the examinations:

(1) The June Examinations:

(a) For the Lower, Middle, and Upper School examinations, \$1.00 per paper, with a maximum of \$5.00 for the Lower, \$10.00 for the Middle and \$15.00 for the Upper or for any combination of the Lower, Middle, and Upper School examinations.

(b) In the case of the June examinations, the prescribed fee shall be paid on the first day of the examination to the Presiding Officer, and shall be forwarded to the Public School Inspector, who shall pay 60 per cent. of the fee to the Department of Education and 40 per cent. to the Board of the school at which the examination is held.

(2) The September examinations:

(a) For the September Middle and Upper School examinations, the examination fees shall be \$1.00 per paper, with a maximum fee of \$15.00.

(b) All such fees shall be payable to the Department at the time of application.

(c) At any centre established under 3 (3) (b) above, where the amount of the examination fees paid by the candidates is less than twice the cost of presiding at that centre, the candidates shall pay additional fees for presiding as follows: Where on any half-day only one candidate is writing, \$3.00; only two candidates, \$2.00 each; only three candidates, \$1.00 each. These fees for presiding shall be paid to the Presiding Officer

at the time of the examination and shall be forwarded by him to the Department of Education.

(3) An additional fee of \$1.00 will be imposed if the application is made after the prescribed date.

APPLICATION FOR ADMISSION.

5. Application for admission to the examinations shall be made as follows, on an official Form which will be supplied to the candidate by the Inspector:—

(1) To the Public School Inspector on or before the 1st of May for admission to the June Lower, Middle, and Upper School examinations.

Official forms for reporting the lists of candidates for the different examinations will be sent to the Public School Inspector.

(2) To the Deputy Minister of Education on or before September 1st for admission to the September Middle and Upper School examinations.

LIMITATIONS OF ADMISSION.

6. No applicant may be admitted to any of the examinations detailed in the Regulations which include English Literature, unless he complies with the following conditions:

(1) In the case of teachers who are actually and regularly engaged in teaching, the official form of application shall include a certificate, signed by the applicant, that he has read carefully during the preceding year, in addition to the works prescribed for the examination, at least four suitable works in English Literature, at least one of which shall be poetry, and the names of the books and the authors shall be given in said certificate.

(2) In the case of other applicants, the official form of application shall include a similar certificate signed by the Principal of the School in which the candidate has completed the course for said examination.

PAPERS.

7. (1) One question paper shall be set in each subject, except in the case of English, Agriculture and Horticulture, and each of the following languages: Latin, Greek, French, German, Italian, Spanish. In each of these subjects there shall be two papers.

(2) Optional questions shall be given at all the examinations in History, and may be given in any other paper at the discretion of the Board of Examiners concerned.

(3) In addition to the examination on passages from the prescribed authors, questions on eight passages shall also be set at all the examinations in Greek, Latin, French, German, Italian, Spanish, and may also be set at the examination in English Literature.

(4) For each of the above examinations which includes English Literature as a subject, candidates will be expected to have memorized the prescribed passages in the English Literature texts, and their knowledge thereof will be tested in the English Literature paper.

VALUATION OF PAPERS.

8. (1) Every paper shall be valued at 100 marks.

(2) At all the Lower, Middle, and Upper School examinations one mark shall be deducted for each error in spelling, but not more than ten marks shall be deducted for such errors on any one paper.

(3) If, after the answer papers have been read, any question paper should be found to be longer, easier, or more difficult than required, due allowance may be made therefor.

EXAMINATION REPORT.

9. (1) Before an examination begins, a report in a form prescribed by the Minister shall be submitted, signed by all the teachers concerned, as to the standing of their candidates. This report, when tested as in the case of the High School Entrance examination, will be taken into account in settling the results.

(2) The names of all the candidates from the school shall be included in this Report.

APPEALS.

10. (1) The answer papers of all candidates at the Lower, Middle, and Upper School examinations, who, on the valuation of the Associate Examiners, are found to have failed in any paper by not more than a small margin, shall be re-read by a Revising Committee before the settlement of the results. Candidates who still fail on this second reading shall have their statement of marks stamped "Re-read," and in such cases no appeal will be allowed.

(2) Candidates who fail and whose papers have not already been so re-read, may have their papers re-read on lodging an appeal before September 1st and paying a fee of \$1.00 per paper up to a maximum of \$5.00, which will be returned if the appeal is sustained. For an appeal received after September 1st the fee shall be \$2.00 per paper up to a maximum of \$10.00.

(3) Candidates making appeals shall state where they wrote and the

name of the examination attempted. Principals sending in appeals in behalf of pupils shall make each appeal on a separate sheet of paper.

(4) Should illness, bereavement, or any other unavoidable cause interfere with a candidate's examination, such circumstances shall be duly taken into account in setting the results, but only when fully reported to the Department with satisfactory documentary evidence, not later than the close of such examination.

EXAMINATION REQUIREMENTS.

STANDARDS.

11. (1) Candidates may write on one or more papers at a time in any order as approved by the Principal. On obtaining fifty per cent. of the marks assigned to any paper they will be given credit for having passed in such paper and will receive a certificate of such standing.

(a) At the Lower and Middle School examinations certificates will be issued showing the standing obtained on each paper, as follows:

First grade proficiency, 75%; Second grade proficiency, 66%; Third grade proficiency, 60%; and Credit, 50%.

(b) At the Upper School examination the certificates will show credit on each paper where 50% is obtained and honour standing by departments according to the standards set for Honour Matriculation: First Class, 75%; Second Class, 66%; and Third Class, 60%.

(c) Forty per cent on a paper in any one of the following Upper School subjects will be accepted in lieu of credit for the corresponding Middle School paper:—English (Literature and Composition), Algebra, Geometry, Chemistry, and the languages. Forty per cent. on the Upper School paper in History will also be accepted in lieu of credit for the Middle School paper in British History.

Forty per cent. on the Upper School paper on Biology will be accepted in lieu of credit for the Lower School papers on Botany and Zoology.

(2) These certificates of credit will be accepted pro tanto for admission to the Normal Schools and to the Universities and Colleges. Special certificates for this purpose will be unnecessary.

(3) An academic certificate showing that the holder has passed the complete examination prescribed for admission to a Normal School, or for Pass Junior Matriculation will be issued on special application accompanied by the fee of \$5.00.

12. (1) The following Lower School certificates, viz., Lower School Normal Entrance, Model Entrance, Senior Public School Graduation, or Senior High School Entrance, issued under the former Regulations, will be accepted as meeting the requirements of the new Regulations for the corresponding examinations.

(2) Candidates at any of the former Lower School examinations enumerated in 12 (1) above, who have credit for at least two of Arithmetic, Grammar, Art, Geography, History, Elementary Science, English Literature, English Composition, and Algebra and Geometry, may complete their standing by passing in the additional papers which they require under the new Regulations. Such candidates need not take the paper in Physiography.

(3) Under the above provision credits for British and Canadian History, Geography, Elementary Science, and Algebra and Geometry under

the former Regulations are accepted, respectively, as credits for Canadian History and Civics, Commercial Geography, the two papers, Botany and Zoology, and the two papers, Algebra and Geometry, under the new Regulations.

13. Candidates who failed at any of the former Lower School examinations and who did not obtain credit for more than one of the papers enumerated in 12 (1) above, shall complete their standing under the new requirements. Accordingly, all such candidates shall write on the paper in Physiography.

14. On application, candidates for entrance into the Model Schools or into the Normal School courses leading to First or Second Class certificates, or for Matriculation into the University, will be given credit for each paper on which they have obtained at least fifty per cent. at any former Departmental Lower School, Model Entrance, Middle School, or Upper School examination.

15. Candidates who have credit for one or more papers of the former Middle School or Junior Matriculation examination, may complete their standing by passing in the additional papers which they require under the new Regulations. Under this provision, credit for the former paper in British and Canadian History is accepted as credit for the new paper in British History.

16. Candidates who have credit for one or more papers of the former Upper School or Honour Matriculation examination, may complete their standing by passing in the additional papers which they require under the new Regulations. Under this provision, credit for History (Second Course) is accepted as credit for Modern World History. Credit for History (First Course) is not so accepted.

17. Candidates who in any year prior to 1920 wrote on the examinations conducted by the University Matriculation Board, and who wish to qualify for entrance into the Normal School courses leading to First or Second Class certificates, will be given credit for each paper on which they obtained at least fifty per cent.

SUBJECTS OF EXAMINATION.

Requirements for Admission to the Normal Schools.

18. (1) Applicants for admission to the course for Second Class Public School Teachers in the Normal Schools shall submit certificates of having passed the Departmental examinations in the following subjects:—

(a) Subjects of the Lower School Course:

Arithmetic, Grammar, Art, Geography, Physiography, Canadian History and Civics, Botany and Zoology.

Note. (i) Agriculture and Horticulture (two papers) may be substituted for Botany and Zoology.

(ii) An examination in Latin Grammar based on the Lower School course, or the examination in Latin Composition of the Middle or Upper School, will be accepted in lieu of the examination in English Grammar.

(b) Subjects of the Middle School Course:—

English (Literature and Composition), Algebra, Geometry,

Physics, Chemistry, British History, Ancient History.

Note: Agriculture and Horticulture (two papers) may be substituted for Physics and Chemistry.

(2) Applicants for admission to the course for First Class Public School Teachers in the Normal Schools shall submit certificates of having passed the Departmental examinations in the following subjects:—

(a) Subjects of the Lower School Course:—Biology (when this subject is not selected in the Upper School).

(b) Subjects of the Middle School Course:—Physics, Chemistry (when this subject is not selected as an option in the Upper School).

(c) Subjects of the Upper School Course:—English (Literature, Composition), History;

Two of: Algebra, Geometry, Trigonometry;

Two of: Latin, Greek, French, German or Spanish, Biology (Botany and Zoology), Physics and Chemistry (for either of which the third Mathematical subject may be substituted).

REQUIREMENTS FOR MATRICULATION.

(3) The subjects of the Middle School required for Pass Matriculation are the following:—

English (Literature, Composition), British History, Ancient History, Algebra, Geometry, Latin;

Two of:—Greek, French, German, Spanish or Italian, Science (Physics and Chemistry, or Agriculture and Horticulture).

(4) There is no special examination known as Honour Matriculation or Senior Matriculation; but Proficiency standing may be granted on all Pass papers, and Honour standing may be granted in English (Literature, Composition), History, Mathematics (Algebra, Geometry and Trigonometry), Latin, Greek, French, German, Spanish, Biology (Botany and Zoology), Physics, Chemistry.

(5) Honours are not granted on papers, but on the combination of papers set in a subject, e.g., English, Mathematics, Latin, etc.

(6) The standing for Honours is a minimum of fifty per cent. on each paper, with an average of sixty per cent. in the papers of each subject.

GRADUATION DIPLOMAS.

19. (1) On application of the Principal, a Graduation Diploma will be granted to every candidate whose conduct has been satisfactory and who fulfils the following conditions:—

- (a) The candidate must pass an examination on twelve papers, selected by the Principal as suitable to the candidate and to the organization of his school.
- (b) The twelve papers must include:—
 - (i) The Lower School paper on Canadian History and Civics.
 - (ii) The Middle or Upper School papers on English Literature and English Composition.

- (iii) The Middle School paper on British History.
- (iv) At least five other papers on subjects of the Middle or Upper Schools.

(2) Where a subject is selected which is required for admission to the Normal Schools or to the Universities, the candidate must take this examination. In other approved subjects there must be a test recognized by the Department.

(3) Except in the case of Lower School Latin when taken in lieu of the examination in English Grammar, a paper in the same subject (e.g., Algebra, Physics, Latin, etc.) cannot be accepted from more than one of the Lower, Middle, or Upper School courses.

(4) Where a language is selected, except in the case of Lower School Latin, both papers in that language must be taken, either both in the Middle School, or both in the Upper School, or one in the Middle and the other in the Upper School.

(5) The Diploma shall indicate in every case every subject taken by the candidate for examination.

(6) A candidate who has been awarded a Graduation Diploma, and who subsequently passes on additional papers may, on application, have such additional papers recorded on his Graduation Diploma.

REPEAL OF REGULATIONS.

All former Regulations of the Department of Education that are inconsistent with the Regulations herein are hereby repealed.

